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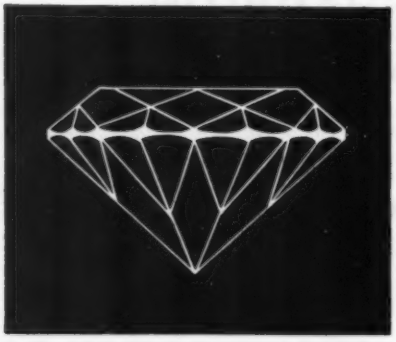

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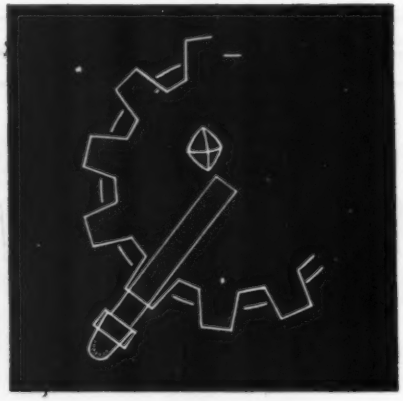

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Vol 20 No 233
APRIL 1960

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Generally Speaking

World Production of Natural Diamonds

The world production figures have followed a fairly consistent pattern for a number of years now, with the smaller producers keeping more or less to a steady figure, and the larger, with their greater resources, and better possibilities for improving mining and recovery methods, and their ability to streamline production by centralization and reduction of overheads have been showing a steady increase in output. At this point it is interesting to mention that Mr. Harry Oppenheimer, in a remark that was quoted—or rather misquoted by being taken out of context—widely at the time, said that the present visible reserves of diamonds would probably be exhausted in 20-25 years. He added that this was on the assumption that no new deposits were found. As in fact, this has been, roughly speaking the normal situation at any time in this century, the alarm that the statement caused in some circles appears to have been unnecessary.

Production Leaders

Once again the three leaders in the production are, in order of output, The Belgian Congo, Ghana and the Union of South Africa. Tanganyika is now approaching the million carat mark, and the other African producing territories are also increasing. India, Brazil, British Guiana, Venezuela and other small producers show little change in output, whilst some of the West African figures are difficult to interpret as the portion of the real output that goes through illicit sources is difficult to estimate accurately. It seems fairly certain that in most cases this proportion is decreasing, and that more and more of the actual production is going through recognised and checkable channels.

ADAMANT

*Some Account of Diamond Winning Practices in Southern Africa**

By **R. J. Adamson B.Sc. (Pretoria) M.I.M.M.**

Continued from p 59.

Consolidated Diamond Mines

From the time that heavy media separation was envisaged as a potential method for treating diamond ores it had been appreciated that the sandy gravels in South West Africa should be particularly amenable to this type of concentration—an opinion duly confirmed by laboratory tests. Therefore when the need arose to extend operations at The Consolidated Diamond Mines shortly after the pilot plant at Premier Mine had closed down, the opportunity was taken to transfer this unit to South West Africa. Here it proved a most successful successor to the Plietz jig installations which had been the main primary concentrators at CDM ever since the earlier Schiechel jig plants in the Luderitzbucht area had ceased operating in 1931 (Fig 15, 16 and 17).

Kimberley

Although not found to be economically superior to washing pans the primary concentration, heavy media separation did prove more acceptable than Harz jigs for secondary concentration. In combination with previously developed improvements to the grease table design, it provided a more economical and more easily controlled re-concentration circuit. A new recovery section was therefore erected in 1952 and sited adjacent to the central washing plant. As a result the time honoured pulsator at long last became superannuated. Its successor comprised a single heavy media separation cone and a small compact grease vibrator installation. These two sections achieved the same efficient diamond recovery as had been attained by the pulsator, but at much less cost and with a considerable reduction in personnel, both operational and maintenance.

Fig 15. Schiechel jig plant at Elizabeth Bay: Consolidated Diamond Mines of South-West Africa, 1927.

Re-Concentration

As there is a considerable variation in the stages and the apparatus adopted for further concentration at the various plants, secondary, tertiary and other stages will be described under the general term of re-concentration.

The improvements to the grease table design had been effected by 1948, the basic feature being the introduction of high frequency vibrations to the table deck in place of the conventional

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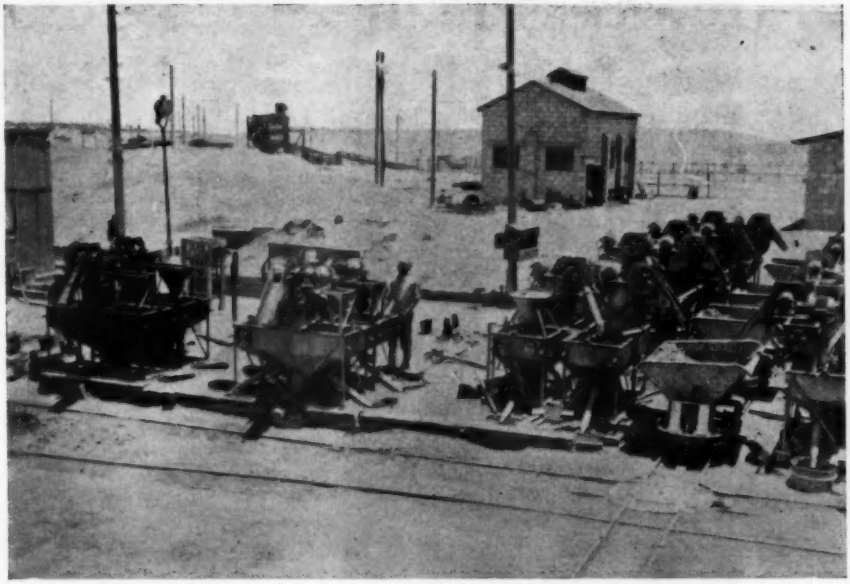


Fig 16. Plietz jig plant at Oranjemund : Consolidated Diamond Mines of South-West Africa, 1950.

side shaking motion (Figs 18 and 19). This resulted in a nearly tenfold increase in capacity per unit area of grease surface.

The substitution of heavy media separation for Harz jigs and the installation of grease vibrators have produced the following set of concentration ratios:

Table IV

Washing pans	32 : 1
Heavy media separation	6 : 1
Grease recovery	50,000 : 1
Hand-sorting	2 : 1
Total	19,200,000 : 1

Jagersfontein and Premier Mines

Grease vibrators had already been incorporated in the new Jagersfontein plant which was erected in 1949 (Figs 20 and 21) and also in the Main Premier plant which was brought into operation early in the following year. In both cases the exceptionally high capacity of the vibrators permitted the elimination of the usual secondary jig concentration stage. As a result, the concentrates from the primary treatment sections were passed directly to a battery of grease vibrators. This reduced the process to three concentration stages and the ratios obtained were:

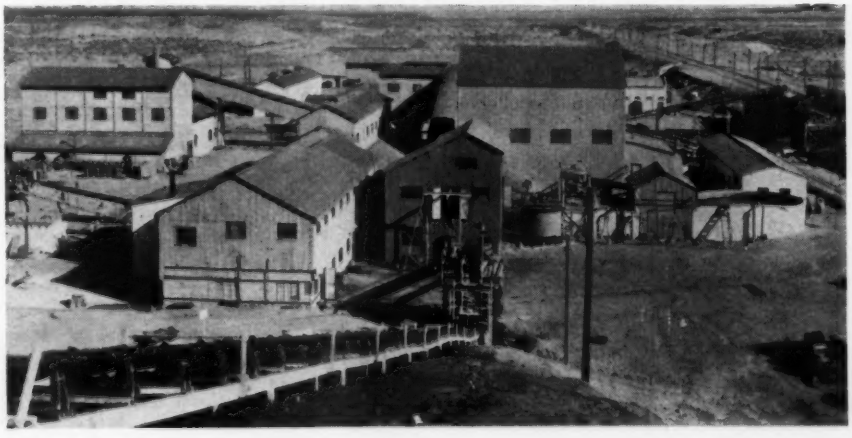


Fig 17. Treatment plant at Oranjemund : Consolidated Diamond Mines of South-West Africa, 1957.

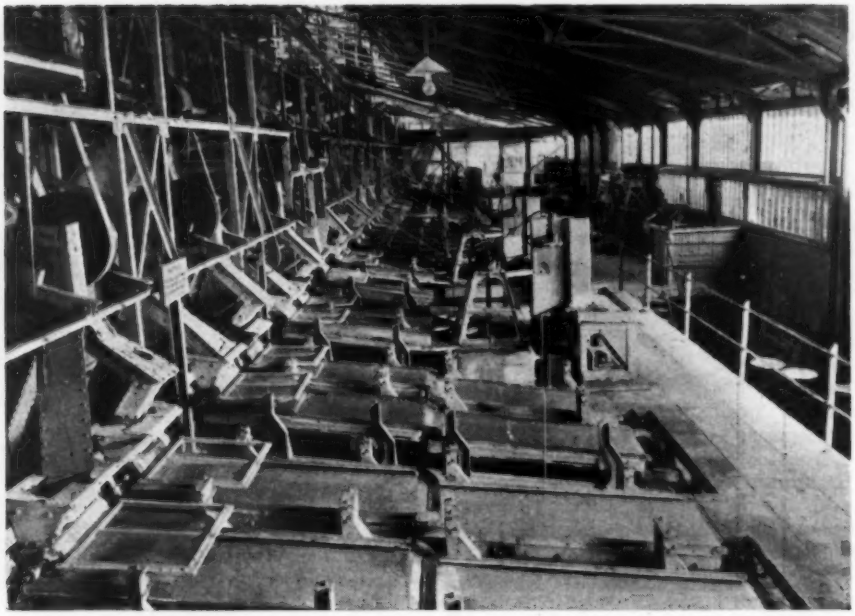


Fig 18 (above). Side shaking grease tables in pulsator : De Beers Consolidated Mines Ltd, 1924.

Fig 19 (below). Grease vibrators in the recovery plant : Premier (Transvaal) Diamond Mining Co, 1950.

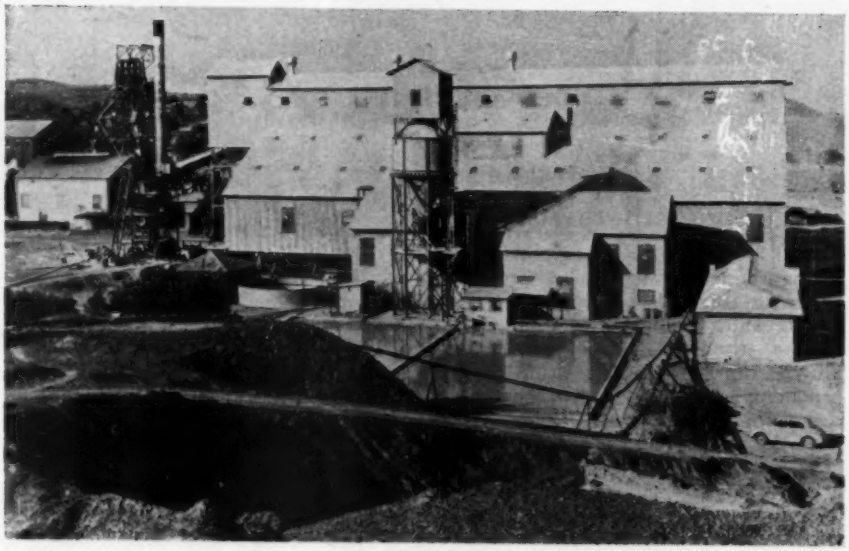


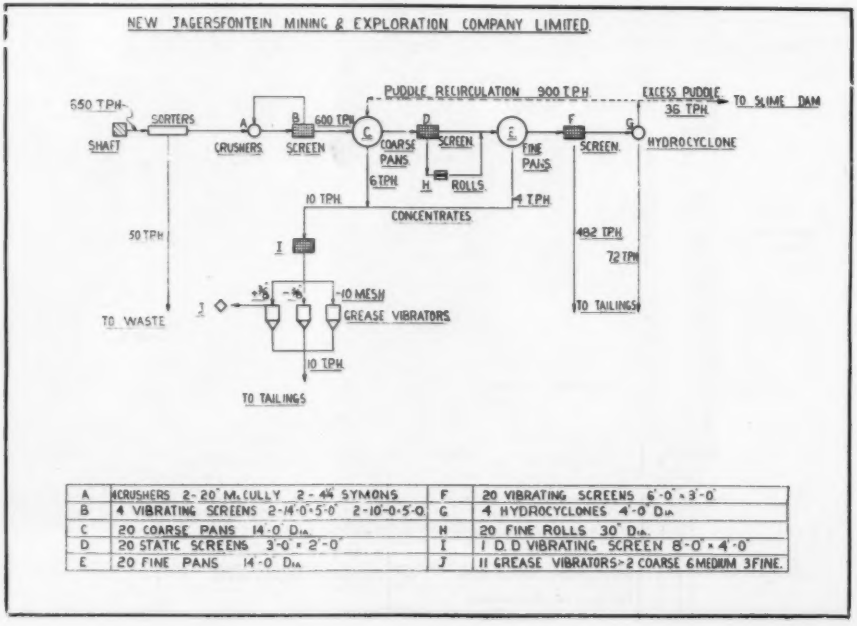
Fig 20. Treatment plant; New Jagersfontein Mining and Exploration Company Ltd, 1949.

Table V

	Premier	*Jagersfontein*
Heavy media	25 : 1	—
Washing pans	—	60 : 1
Grease vibrators	80,000 : 1	100,000 : 1
Hand-sorting	7 : 1	10 : 1
Total	14,000,000 : 1	60,000,000 : 1

Consolidated diamond mines

The considerable economies offered by the vibrating grease tables focused attention on the lack of success that had hitherto been experienced in attempting to apply grease recovery to the diamonds in the marine gravels at CDM.



A	4 CRUSHERS 2-20" McCULLY 2-4½ SYMONS	F	20 VIBRATING SCREENS 6'-0" × 3'-0"
B	4 VIBRATING SCREENS 2-14'-0"×5'-0" 2-10'-0"×5'-0"	G	4 HYDROCYCLONES 4'-0" Dia.
C	20 COARSE PANS 14'-0" Dia.	H	20 FINE ROLLS 30" Dia.
D	20 STATIC SCREENS 3'-0" × 2'-0"	I	1 D.D VIBRATING SCREEN 8'-0" × 4'-0"
E	20 FINE PANS 14'-0" Dia.	J	11 GREASE VIBRATORS-2 COARSE 6 MEDIUM 3 FINE.

Fig 21. Flow diagram: New Jagersfontein Mining and Exploration Company Ltd, 1958.

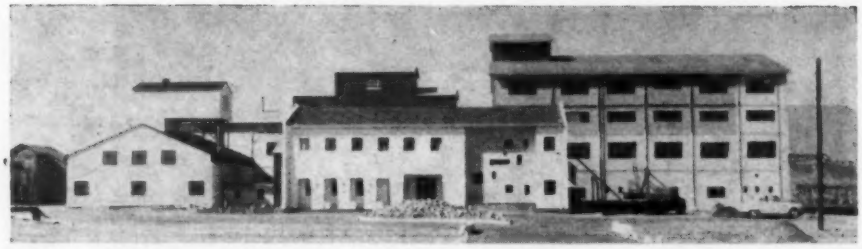


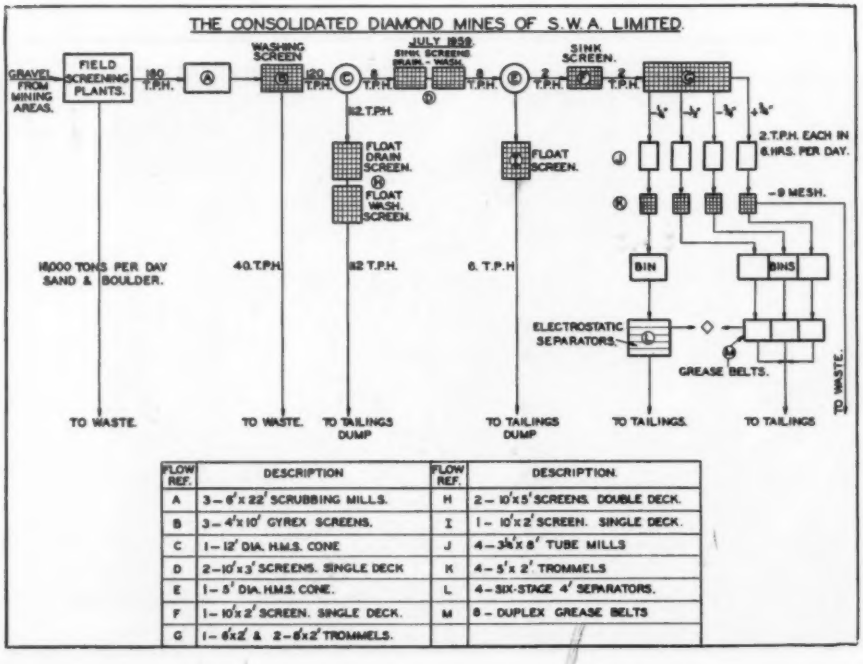
Fig 22. Recovery plant and sort house, Consolidated Diamond Mines of South-West Africa, 1959.

Diamonds liberated from freshly mined kimberlite invariably adhere tenaciously to grease owing to the water-repellency of their surfaces. Many of the stones from the marine terrances and alluvial deposits, however, have lost this water-repellent property and through not presenting a dry surface to the grease would be washed away with the tailings.

A research programme instituted at the Diamond Research Laboratory produced an effective modification which overcame this difficulty. The basic features consist of additions of conditioning reagents to the concentrates and continuous instead of intermittent replenishment of the grease surface. In the finer size range of gravels, however, this procedure was not entirely satisfactory and it was found preferable to adopt electrostatic separation, also developed by the Laboratory for diamond recovery, to re-concentrate the ¼ in. sink fraction from the heavy media plant (Figs 22, 23 and 24).

For effective operation of both grease recovery and electrostatic separation it was necessary to ensure that the surfaces of the diamonds were clean and free of any saline or other films that might render the stones refractory. Consequently the concentrates from the heavy media plant were subjected to a scrubbing action in small ball mills. This procedure also effected a minor degree of concentration, as a portion of the gravel was reduced to discardable grit by the milling process.

Although efficient, the grease belts and electrostatic separators were somewhat limited in capacity and therefore, to obviate a large extension of these units when increased production



FLOW REF.	DESCRIPTION	FLOW REF.	DESCRIPTION
A	3 – 6′ x 22′ SCRUBBING MILLS.	H	2 – 10′x 5′ SCREENS. DOUBLE DECK.
B	3 – 4′ x 10′ GYREX SCREENS.	I	1 – 10′x 2′ SCREEN. SINGLE DECK.
C	1 – 12′ DIA. H.M.S. CONE	J	4 – 3½′x 8′ TUBE MILLS
D	2 – 10′ x 3′ SCREENS. SINGLE DECK	K	4 – 5′ x 2′ TROMMELS
E	1 – 5′ DIA. H.M.S. CONE.	L	4 – SIX-STAGE 4′ SEPARATORS.
F	1 – 10′x 2′ SCREEN. SINGLE DECK.	M	8 – DUPLEX GREASE BELTS
G	1 – 6′x2′ & 2 – 6′x2′ TROMMELS.		

Fig 23. Flow diagram : Treatment plant : Oranjemund, Consolidated Diamond Mines of South-West Africa.

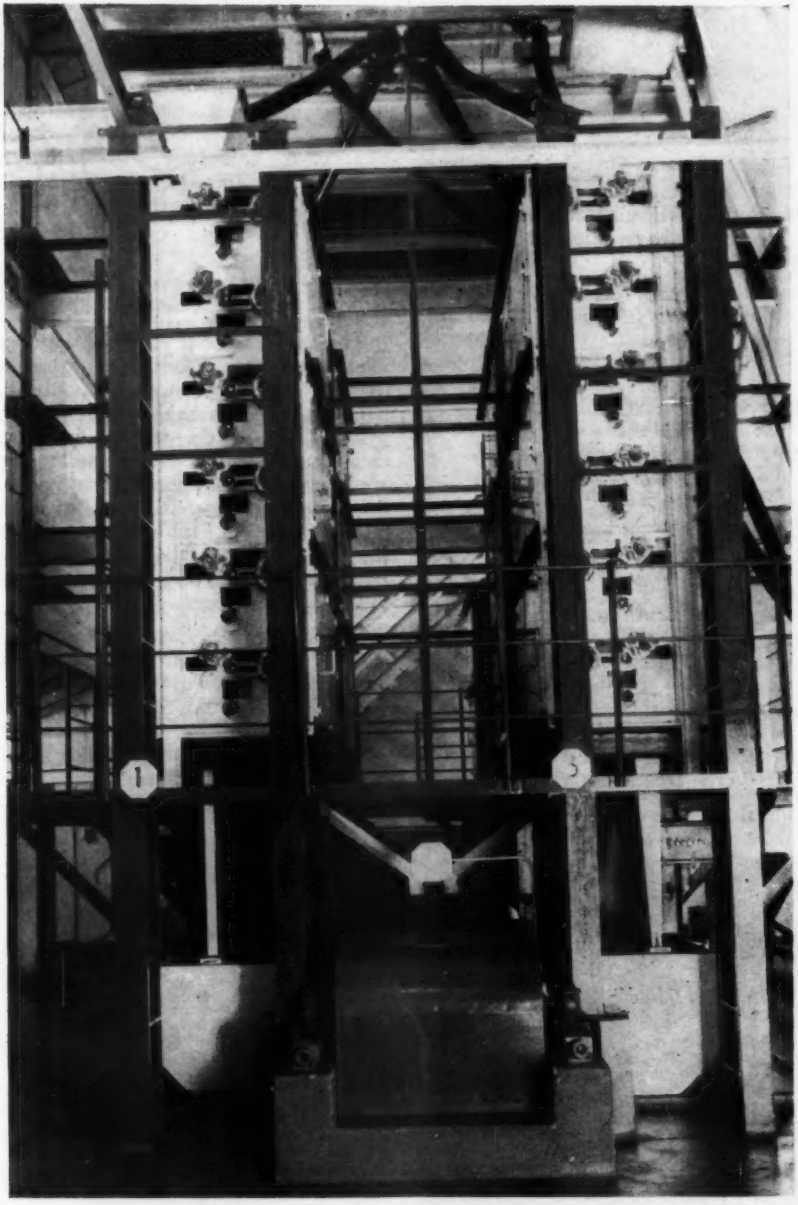


Fig 24. Electrostatic separation section: Oranjemund, Consolidated Diamond Mines of South-West Africa.

was projected, an intermediate concentration stage was tried in the shape of a secondary heavy media separation cone designed to re-concentrate the sink fraction produced from the primary circuit. This innovation proved successful and a concentration ratio of two to one was attained. Subsequently, by the introduction of a special type of ferro silicon medium this ratio was doubled. The new medium permitted operation at higher specific gravities without undue increase in viscosity. As yet this medium has not proved entirely suitable for use in large cones and has perforce been confined to small units which, however, have adequate capacity for secondary circuits.

The concentration ratios presently obtaining at CDM are approximately:

Table VI

Field screening and scrubbing	6 : 1
Primary heavy media separation	15 : 1
Secondary heavy media separation	4 : 1
Attrition milling	1½ : 1
Grease or electrostatic separation	100 : 1
Hand-sorting	500 : 1
Total	27,000,000 : 1

Due to the need for the provision of a preliminary screening and scrubbing section and the greater variety of concentration methods employed, the treatment plant at CDM is more complicated than those previously illustrated (Fig 25). Embodying all modern improvements in diamond winning practice that have been developed during the last decade it has been the prototype for several treatment plants erected elsewhere.

State Alluvial Diggings

The satisfactory results obtained from heavy media separation, grease belts and electrostatic separation at CDM prompted the erection at the State Alluvial Diggings in 1958 of a plant designed on similar lines. Previously a primary and secondary jigging operation followed by hand-sorting had constituted the treatment operation. The present installation also not only includes the most recent developments in recovery methods but embraces several excellent features of engineering design (Fig 26).

Alluvial Diggings

The remaining categories of diamond producers in South Africa, the small mines and alluvial diggers, depend almost invariably on washing pans and jigs as their concentrating machines. The majority of the diggers, as distinct from the small mines, work with entirely manually operated equipment—screens are rocked by hand, the washing pan is hand-turned and hand-jigging precedes hand-sorting. This procedure has remained virtually unchanged since the last century but still forms a most effective operation, difficult to improve.

Grease recovery would not be practicable in alluvial fields. As in the case of marine terrace deposits, many of the diamonds have weathered surfaces and would require special conditioning measures to ensure their adherence to grease. Such a process would therefore be unrealistic on alluvial diggings and probably uneconomic on small mines.

Fig 25. General view: Treatment plant: Oranjemund, Consolidated Diamond Mines of South-West Africa, 1959.

Fig 26. Treatment plant : State Alluvial Diggings —1958.

Fine diamond recovery

Economic factors have also to be considered in the case of the recovery of small industrial diamonds from kimberlite. When pilot plant operations were conducted at Premier Mine in 1947, pulsating jigs proved suitable for recovering this type of diamond from the finer sizes of kimberlite which were below the range of heavy media separation. Early in 1948 experiments showed that an even better concentration of this material could be obtained by Driessen cyclones using magnetite as the medium. When the economics of the process were studied, however, the low value of the small diamonds recovered did not justify the substitution of hydrocyclones for the more cheaply operated jigs.

It is not always appreciated that a truck load of — 10 mesh kimberlite does not possess very much monetary worth and the margin for its profitable treatment is extremely limited. Thus the higher efficiency of cyclone concentration could not meet the increased costs incurred in the consumption of magnetite medium, electric power and screen cloths. However, where the grade is adequate the hydrocyclone affords a highly satisfactory concentrating instrument for treating fine kimberlite.

Mineral dressing means that have been tried for the recovery of fine sized diamonds but which have not proved successful include flotation cells, shaking tables, Humphrey spirals and vibrating strakes. Their failure is not surprising as the size range of the stones is too great for flotation and the differential in specific gravity between gangue and mineral is too low for efficient separation by the other devices mentioned.

Assaying diamond ores

Sampling

In attempting to asses the payability of diamondiferous deposits or the grade of ore mined or the efficiencies of the various types of concentrators, one of the major obstacles encountered is the difficulty of determining the diamond content of the ore. Not only are individual stones very sparsely distributed in the blue ground or gravel, but they are far from uniformly disseminated. Any attempt, therefore, to evaluate the grade of the ore to be treated requires as a pre-requisite the provision of exceptionally large samples.

The sampling problem is vastly enhanced when tailing values have to be assessed. Even if it be assumed that the extraction efficiency is as low as 90%, it will be apparent that the diamond content of the tailing would at most constitute only one part in two hundred million. Actually in most cases it is less than one in six hundred million. Although it is probable that any residual diamonds are likely to be more evenly spread through the tailings, due to the mixing effect of the treatment process, it cannot be expected that a single carat stone, which weighs 0.2 gramme and constitutes an octahedron of about 1/6 in. side, would be found in a sample of less than 50 tons in weight. A further complication in determining tailing losses is the need to provide extraction methods that differ from those used in production, it being naturally inadvisable to check jigging efficiency by means of another jigging operation, or grease recovery with a further pass over grease tables.

Jigging

For many years the only procedures available to examine tailings for possible losses were either jigging, differential grinding or hand-sorting. More recently grease vibrators have been used to test heavy media separation tailings. Jigging, especially by Plietz jigs, was considered particularly suitable for testing primary concentration efficiency in both washing pans and heavy media cones, since even when, as is usually the case, no diamonds are discovered in

the jig concentrates, an examination of the constituents affords a good indication of the performance of the primary concentrator. Minerals such as garnet, ilmenite, pyrite, olivine, or diopside are consistently present in the kimberlite ores and having a specific gravity similar to or greater than diamonds should invariably report in the primary concentrates. The presence, therefore, of any of these heavy minerals in the tailings would indicate inefficient operation in proportion to which they occurred.

Tromp curves

The application of this principle is being further developed at the Diamond Research Laboratory by means of the Tromp curve evaluation method which offers a more accurate assessment of the probabilities of diamond losses by precise measurement of the presence or absence of high density minerals in the discard. The average diamond ore contains about 95% low density material with a specific gravity of 2.7 or less and 5% comprising a mixture of minerals ranging in specific gravity from 2.8 to 4.5, including diamonds which have a specific gravity of 3.5. To ensure complete recovery of the latter, the concentration process obviously should not reject minerals of specific gravity greater than 3.4 In the Tromp curve evaluation, as used in coal-washing, the distribution of specific gravities in the concentrates and tailings is plotted graphically and the resultant curve presents the percentage recovery effected at any particular specific gravity.

This method, while showing great promise, still requires further investigation, particularly with regard to the effect of deviations in shape, surface porosity and size range of particles.

Differential milling

Grease table tailings or secondary stage sink and float concentrates cannot be tested satisfactorily by jigs owing to the similarity in specific gravity of the constituent minerals. In these cases either differential milling or hand-sorting have to be used. In differential milling the objective is to grind down a large bulk of material to a fine grit without affecting the hard diamonds. The grit can be discarded through a suitable screen and the residual diamonds recovered from the screen oversize.

Radio-active tracers

In 1954 the availability of radio-active isotopes suggested an interesting testing technique which was first tried at the De Beers Consolidated washing plant and subsequently adopted in a modified form at The Consolidated Diamond Mines.

Artificial specimens of diamonds and of characteristic constituents of the ore were fabricated from zinc-aluminium alloys of correct specific gravities and charged with minute lengths of radio-active cobalt wire inserted in small cavities drilled in the alloy samples. Individual specimens were introduced at various points in the recovery circuit and their progress tracked by means of Geiger counters. The results obtained were used to establish the respective efficiencies of the washing pans, heavy media separation cone and grease tables. Subsequently, in case there were differences in the behaviour between diamonds and their artificial counterparts, representative types of diamonds were similarly charged with radio-active cobalt wire and used in a similar manner.

These stones were afterwards adopted for routine tests of the whole treatment process. Monitors with recording charts were set up over the tailings conveyors from the washing plant and grease recovery sections. Periodically a charged stone was dropped into a truck of blue ground entering the plant. If all went well it was recovered by the sorting office staff who were provided with a Geiger counter to scan the daily production. If a test diamond did not report in the sorting office and had escaped to the tailings such an event would be registered on one of the recording charts, showing the precise time of escape. It was soon found that the larger stones were regularly recovered and thereafter tests were mainly conducted with small diamonds of half a carat or less in weight. Even with these it was only on rare occasions that losses occurred.

At CDM radio-actively charged diamonds were also used to investigate the operation of various sections of the process but a variation in technique was adopted with regard to routine testing of recovery efficiency. A team of three operators equipped with scintillometers would take up strategic positions in the portion of the plant to be tested and then 20 to 50 check diamonds would be introduced consecutively to the section. Tracking the movements of the stones and their ultimate reclamation were effected by means of the scintillometers. If all the stones were recovered at the correct outlet—as normally happened—treatment was considered satisfactory. This procedure would be reported daily and the figures accumulated each month gave a reasonably good indication of the recovery efficiency.

Optical separator

A potential assay instrument with considerable prospects of success is being developed at the Diamond Research Laboratory in the form of an optical reflection separator. A prototype of this device is already on trial and it is hoped that it will prove a satisfactory means of checking the efficiency of grease recovery and electrostatic separation. As it is based on the reflecting properties of diamonds it fulfils the fundamental requirement of employing a different physical property in testing production processes.

General

There is still considerable scope for developing accurate ways of determining the grade of diamondiferous ores both in treatment circuits and prospecting operations.

An ideal arrangement that suggests itself would be one based on a radar scanning technique designed to signal the presence of a diamond in a portion of the ore either in situ or while passing through a section of the treatment plant. With the infrequent distribution of diamonds throughout the ore-body such an instrument would be invaluable in sorting the rare grain of wheat from the abundance of chaff, not only in treatment, but also in prospecting and mining. Such a device, however, still exists in imaginary realms of the future.

Future trends

To return to the consideration of more realistic improvements and innovations in diamond winning, some indications of their current trend may be mentioned.

Triple-stage heavy media separation is about to be investigated at CDM by means of an experimental tertiary circuit. The present secondary stage proved so successful that a similar addition to the heavy media plant has been designed for Premier Mine and is in the course of construction. This incorporated for the first time a drum separator instead of the conventional cone in heavy media separation of diamond ores.

In addition, consideration is being given to the erection of a pilot plant to develop the use of heavy liquids, such as lead sulphamate, for supplementary separation stages at specific gravities between 3.3 and 3.6. It is envisaged that successful results in this investigation could provide a multi-stage gravity separation process combining heavy media and heavy liquids that would eliminate not only grease recovery but also hand-sorting.

Experiments have been initiated at CDM to assess the possibilities both of hydrocyclone concentration and of elutriation to the treatment of gravels in size ranges as coarse as ½ in. diameter.

The general trend, therefore, is in the direction of extending the applications of concentration by gravitational processes with the eventual intention of eliminating grease tables and electrostatic separation, both of which suffer from the disadvantage of requiring multiple low capacity units.

A longer-term picture obviously envisages the manufacture of diamonds. It has been postulated that synthesis will probably soon rival if not replace the winning of diamonds from natural sources. In the light of current knowledge this does not appear to be a likely eventuality. Synthetic diamonds are at present entirely confined to the industrial market because of their minute size, irregular shape and virtual opacity.

However, it is certainly correct to say that man-made diamond crystals are being currently produced. No doubt their synthesis will gradually be improved until sizable stones are formed. Probably opaque at first, clearer crystals should follow and ultimately diamonds of the first water may emerge by the perfection of the present embryonic processes that are being designed to reproduce the volcanic forces that created diamonds in primeval times.

When this stage is reached it will nevertheless be surprising if the production costs of man-made gem diamonds do not prove to be considerably higher than those mined from natural deposits. Just as synthetic petrol is handicapped in competition with that derived from natural oil wells, so artificial gem stones have to bear the cost of synthesis that nature has already provided in the case of stones won from the mines. However, the high prices of man-made diamonds will be a secondary consideration if, as may well occur, the sources of natural diamonds become exhausted before synthetic gems are available in quantity. The primary requirement is that synthetic stones should become available in good time to meet the world demand when the supply from nature's reserves ceases.

Conclusion

Due both to the rare and the irregular occurrence of diamonds in the ore, production operations have to be conducted on a vast scale to ensure an adequate and payable output. Huge amounts of earth have inevitably to be moved and sifted for their precious essence. The search for further deposits requires extensive and costly prospecting. Diamond winning, therefore,

cannot be effectively undertaken without large capital investment to provide the essential prospecting, mining and treatment machinery and the equally necessary personnel. Even greater calls on men, money and machines should arise in the future. In all fields of mineral winning the higher grade deposits are being steadily depleted. There seems no reason to assume that diamond mining should escape a similar fate—in fact the grade of the ore mined in known kimberlite pipes is progressively decreasing with depth. The minute ratio of diamonds to the ore that already exists must thus inevitably diminish further and both mining and mineral dressing practices will be faced with even greater tasks in maintaining the requisite output of diamonds in future years. It is a safe forecast that the enduring attraction of these brilliant gems will ensure that the calls are duly answered.

References

A. A. Linari-Linholm—Recovery of diamonds by electrostatic separation—*Journ Chem, Metall & Min Soc S Afr*, October, 1950

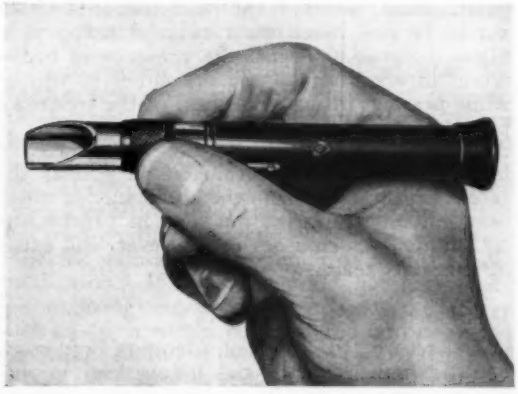
A. R. Harrison—The occurrence, mining and recovery of diamonds—*Journ Chem, Metall & Min Soc S Afr* Apr 1952

R. G. Weavind—The treatment and recovery of refractory diamonds—*Journ Chem, Metall & Min Soc S Afr* May, 1952

S. W. Devlin—Mining procedure and method at CDM—*Journ S Afr Inst Min & Metall* November 1958

INDUSTRIAL POCKET MICROSCOPE

The pocket microscope about the size of the ordinary fountain pen has been produced recently by the Ellis Optical Company, Mayday Rd, Thornton Heath, Surrey, and is being marketed under the name of the Elliscope. With its small size and useful range of magnification (x20 to x40), this instrument has many possible applications in precision engineering. The field is approximately ½ in. in diameter and can be brightly illuminated by the use of the mirror in the tip, which can be used to reflect the light from any suitable adjacent light source. This instrument falls successfully into a position between the simple loupe and the more powerful, but less mobile microscope.



News in Brief

South African Finance Minister, Dr. T. E. Doenges, presenting his Budget in Parliament on March 2, stated that diamonds, wool and manufactures had registered the biggest increase in exports.

Israel's exports in January 1960 amounted to $23,200,000 as compared to $20 million in January 1959.

The January 1960 figure includes diamond exports to the value of $4,900,000. Diamond exports continue to rise.

Moscow physicists have designed a portable field apparatus to detect diamonds in soil samples by means of radioactive isotopes.

Diamond production in South-West Africa for December 1959 amounted to 92,088 cts. Sales of industrial stones totalled 3,947 cts worth £8,019, but no gem stones were sold.

Philips' Gloeilampenfabrieken NV, Eindhoven, have designed a large electron accelerator. It has been supplied to the Diamond Research Laboratory at Johannesburg.

The apparatus is a cascade generator combined with an electron accelerating tube, both built into a pressure tank. It will be used mainly for the study of surface properties of diamonds, their structure, and the effect or radiation on the colour of diamonds.

Diamond in Birmingham

By a special Correspondent

The Industrial Section of the Birmingham Museum was last month the scene of an interesting and unusual Exhibition the purpose of which was to illustrate some of the most modern and little-known applications of the industrial diamond.

The Exhibition illustrated the various applications with actual operating machinery, photographs and examples of the various types of tools that had been perfected during recent years. While the area covered by the Exhibition was relatively small the exhibits adequately illustrated the important part that diamond tools play in present day engineering and allied industries and visitors to the Exhibition left with a marked impression as to how important the industrial diamond is in our everyday lives. Operating machinery at an Exhibition never fails to fascinate and this was particularly true of the exhibits displayed here. The ease with which the diamond was seen to cut and shape some of the hardest known metals surprised many visitors as indeed did the fact that a diamond can be used for so many industrial applications.

Part of Industrial Diamond Exhibition in Birmingham Science Museum.

Particularly interesting was the tiny pencil-like tool with a diamond tip revolving at speeds up to 300,000 revolutions per minute, which had a multitude of uses ranging from engraving on glass to the finishing of delicate and intricate components for use in engineering. It was interesting to note that while the Exhibition itself was being set up this particular tool was employed by another exhibitor for shaping a Tungsten-tipped tool for use in another machine.

A further interesting exhibit was a diamond drilling machine of the type recently employed in the preservation of Stonehenge, it was decided that a task of drilling holes in one of the uprights in need of strengthening should be trusted to a machine using a diamond drilling crown. Visitors watched this type of machine drilling through blocks of stone at a surprising speed.

Also on display was part of the equipment used in the Glaxo Laboratory for the removal of a section of the shell of a hen's egg without damage to the inner membrane. Removal of the shell in this way facilitates the injection of virus into the egg without interference to the living cells inside. The particular machine used for this operation is a very fine dental-type saw impregnated with diamond dust, in the hands of a skilled operator the removal of the shell is a comparatively easy matter.

Turning to the larger exhibits, these included a number of diamond saws ranging up to five feet in diameter. These saws are capable of cutting through large blocks of hard stone quickly and efficiently; this particular application of the diamond is being used more and more as present day architecture demands better and more attractive finishes for large buildings. A lathe equipped with diamond-tipped tools illustrated the high finish which can be obtained on extremely hard metals with diamond. Watching these tools in operation it was difficult to realise that the metal being finished was in fact extremely hard; next to this lathe was a machine capable of measuring to very fine limits the surface finishes produced on the lathe and the accuracy of the finish was indeed a surprise to many. One could say much more about this exhibition and discuss some of the other interesting applications of the diamond but the range of diamond tools in present day use is such that there would be a grave danger that this magazine would be filled to overflowing, let it suffice to say that a great number of people of Birmingham found the Exhibition most satisfying and interesting and have learnt how important the diamond is to present day civilisation.

Letter to the Editor

Sir,

A method of prolonging the life of truing diamonds is of great importance to trade and industry. No doubt, Professor Pahlitzsch had the right idea when he tried to find out the influence of the crystallographic orientation on the wear of truing diamonds. His rough and polished test diamonds were set in such a way that the grinding wheel attacked them in different crystallographic planes.

Professor Pahlitzsch does not seem to have discussed the further design of his tests with anybody who was familiar with the structure of diamond. From the description of his experiments (*Industrial Diamond Review* 1960 Vol 20 pp 31-37 (Feb)) it seems that he wanted to eliminate the influence of directions of highest and lowest wear resistance within one specific crystallographic plane by rotating the tool shaft through 90° after each individual test run. In the case of the cube plane (100) with its fourfold symmetry, this must have created just those conditions, which he wanted to avoid. His diagram (Fig 8K) shows the four directions of wear resistance which run parallel to the two crystal axes in the cube plane. It can be seen easily that a rotation of the crystal through 90° around the normal of the cube plane leads to attacks of the grinding wheel in theoretically identical crystal directions of the plane. It is probable that the four faces of the shaped (4 P) pyramid were polished over the edges of the natural octahedron, which means that the grinding wheel attacked the cube plane in the four directions of least wear resistance.

Rotation through 90° of the tool shaft may also have produced spurious results with regard to the dodecahedron plane (110). Fig 4a and b do not allow a definite conclusion with regard to the position of the crystal axis, but it is just possible that the four directions of grinding wheel attack may have coincided with theoretically equivalent abrasion directions.

Within the octahedron plane directional differences of wear resistance are not very pronounced. This plane has a threefold symmetry, ie theoretically six directions of high wear resistance and six of low resistance. Rotation of the tool shaft through 90° after each test run will have eliminated therefore the effect of the small directional differences of wear resistance.

To maintain as far as possible the geometrical form of rough diamond truing tools, it is the general practice to rotate the tool shaft after several truing operations. Therefore, it seems justified in these cases to consider—as Professor Pahlitzsch has done—wear resistance as a bulk property of distinct crystallographic planes. In profile truing with shaped diamond tools, for instance, it would be advisable to use tools which have been fashioned in such a way, that the direction of grinding wheel attack coincides with a direction of highest wear resistance within the plane.

If one accepts wear resistance as a bulk property of a distinct crystal plane, the ' qualitative ' results of Professor Pahlitzsch's tests are certainly correct and in accordance with the findings of previous workers: In diamond the dodecahedron plane is the least resistant, the octahedron plane the most resistant, and the resistance of the cube plane lies between the two. Of course, this does not imply that for instance the direction of least resistance in the cube plane is of higher resistance than any direction in the dodecahedron plane. The ' quantitative ' results of Professor Pahlitzsch's tests have been influenced most probably by omitting to consider the symmetry of the crystal planes.

The fact that the octahedron plane is the ' hardest ' has unfortunately led Professor Pahlitzsch to the conclusion that truing diamonds should be mounted in such a way that the normal of the plane [111] coincides with the long axis of the tool shaft. This is certainly advisable for feeler points, and bearings and similar tools, but it is unlikely that many truing tool manufacturers will take up the suggestion because the octahedron plane is the cleavage plane of diamond, and a wheel to be trued attacking with shock-like blows in a direction parallel to the cleavage plane would soon shatter a truing diamond in a most dramatic fashion. It speaks very much for the careful handling and the fine equipment in Prof. Pahlitzsch's tests that accidents did not happen to his test specimens.

After all, much seems to be in favour of the general practice, that rough diamonds are set in truing tools with a crystal axis parallel to the tool shaft. Octahedra (being the most common habit) offer in this way a truing point of good geometrical form. The wear plane is (approximately) the cube plane. It would be a good idea if more manufacturers would indicate the four directions of highest wear resistance in the plane by dots on the tool shaft.

Yours faithfully,

W. Stern.

St. Andrew's House,
32/34 Holborn Viaduct, London E.C.1.
March 14, 1960.

Northern Debut for Gas Exhibition

By a Special Correspondent

The first *Gas at Work in Industry* exhibition ever to be staged in the North of England was officially opened at Harrogate on Monday, March 28th, by Sir William Scott, O.B.E., J.P., M.I.Mech.E., Managing Director of Armstrong Whitworth (Metal Industries) Ltd and Jarrow Metal Industries Ltd, following a similar exhibition held in London.

The exhibition is staged in Harrogate's New Exhibition Hall by the North Eastern and Northern Gas Boards, and will continue until April 1st. Two similar exhibitions have been held in London, one in 1957 and one this year, and although the Northern exhibition includes several items which were shown in London earlier this year, it is considerably larger than either of its predecessors.

Products of joint research by the sponsoring Gas Boards are displayed and several of them are of interest to the precision tool and allied industries. These include a miniature jet burner for producing high heat concentrations on very small areas, and a prototype crucible furnace for melting brass and aluminium which uses pre-heated air to give higher melting speeds; forced evacuation of the combustion products gives a cleaner working atmosphere.

Also developed by the Gas Boards is a new form of salt bath for annealing wire between drawing stages by immersion of the wire in a heat treatment salt. Waste heat recovery is provided in the form of load recuperation plus the pre-heating of combustion air to a temperature of 540 degrees Centigrade.

Industry's exhibits include a fully-automatic gear hardening machine which uses the recently perfected spin hardening method. The plant is available for hardening small gears up to 5 ft diameter and 10 in. tooth width, and floor-to-floor time for a small spur gear of 8¼ in. diameter and 4 in. tooth width is 3½ minutes. The use of this plant, available from Surford Ltd, London, completely eliminates the need for subsequent grinding in most cases.

The RJH Tool & Equipment Co Ltd of Heckmondwike, Yorkshire, are showing their 'Hippo' wet bandfacer polishing equipment which uses special waterproofed abrasive bands with a water coolant. It can be used for badge polishing and for grinding ceramics, glass, and plastics. Also of interest to badge manufacturers and manufacturing jewellers is the new conveyorised pre-heating and fusing plant displayed by Stewart Gill Ltd, of Slough. Accurate control of time and temperature eliminates 'hit or miss' methods in this process.

Further details of exhibits can be obtained from the manufacturers of the equipment or from the Public Relations Officer, North Eastern Gas Board, Bridge Street, Leeds 2, Yorkshire.

Editorial Note

Opinions expressed by correspondents are their own and are not necessarily endorsed by the Industrial Diamond Review.

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INDUSTRIAL DIAMOND ABSTRACTS

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Telephone : FLEet Street 1577

1960 Volume 17
APRIL

DIAMOND MINING AND INDUSTRY

De Beers to market Soviet diamonds

Soviet Correspondent. *Financial Times* 1960 (Jan 19)

A report of the Diamond Corporation's announcement on January 18, 1960. An exclusive agreement has been signed in London, whereby all the diamonds from the Soviet Union's output which the Soviet authorities intend to export for marketing in the West, will be bought by the Corporation and sold through the Central Selling Organisation. No further comments were made by either party to the agreement.

D *F.251.33*

Diamond prices to be unchanged

Anon. *Glasgow Herald* 1960 (Jan 21)

According to an official of the Diamond Corporation of South Africa, the agreement for the purchase of Russian-produced diamonds, signed in London, will in no way affect the Corporation's sales and pricing policy.

D *F.251.33*

Comment : stones in the diamond pool

Anon. *Times Rev Ind* 1960 (Feb)

Stresses that most of the six million cts of diamond produced by the USSR are industrials for which there is a vast internal demand ; but the USSR wants to sell gemstones which form only about 5% of Yakutia's production. The author considers that the Diamond Corporation will be able to absorb Soviet output, without cutting back production at its own mines, since world diamond sales reached a record last year and the boom is likely to continue. However, a problem will arise if Soviet production increases sixteenfold by 1965 and there is some prospect that plans for this will be fulfilled. *D* *F.251.33*

The advent and rise of Russian diamonds

Anon. *Diamond News* 1960 Vol 23 (4) pp 9-11 (Jan)

A general article based on the information available about Russian diamond digging and mining, and the effects of Russian diamond production on world markets. 1 illustr. *D* *F Hb.33*

Diamonds in the Commonwealth

R. Leeper. *New Commonwealth* 1958 Vol 35 (1) pp 17-20 (Jan 6) ; *Bibliogr Courante* 1959-60 Vol 13 p 128

K *F.12.361*

[New Russian deposits]

Anon. *Gemmologist* 1960 Vol 29 (342) p 20 (Jan) ; *Diamond News* 1960 Vol 23 (4) p 15 (Jan)

Both Moscow Radio and the news agency Tass have reported the finding of a rich new diamond deposit by Soviet geologists in the north Ural mountains in the upper reaches of the Visher River. This was referred to as 'vast' diamond fields and it has been claimed that the output of the Urals will increase at least ten-fold. It was also mentioned that the stones were used in the jewellery industry, so presumably the new deposits include crystals of gem quality.

D *Eb.33*

Monthly review : diamonds

Anon. *Min Mag, Lond* 1960 Vol 102 (1) p 6 (Jan)

In the three months to December 31 last, De Beers Consolidated Mines, through the Central Selling Organisation, effected diamond sales worth £22,729,096, of which £15,465,301 is attributable to gemstones. Total figures for 1959 are given as £91,135,943, gemstones making £63,033,187 of the whole.

D *F.251*

Hats off to diamond industry !

Anon. *Diamond News* 1960 Vol 23 (4) p 3 (Jan)

Three diamond industry records were broken in 1959 : sales of gem and industrial stones totalled £91.1 millions ; sales of gemstones were £63 millions ; and sales of industrials amounted to £28.1 millions. All these surpassed previous figures.

D *F.25*

Exclusive : leaders predict : the state of the industry

Anon. *Grinding & Finishing* 1960 Vol 6 (1) pp 34-40 (Jan)

Reference is made to the place of diamond in the grinding and finishing industry. It is concluded that both natural and synthetic diamond have their place and continued research will benefit all users of diamond wheels. *D* *Chc.25:N/Chm.25:N*

Text of new five-year agreement at Sierra Leone

Anon. *Diamond News* 1960 Vol 23 (4) p 14 (Jan)

Concerns the agreement by which the Sierra Leone Government will set up its own buying office, managed but not controlled by the Diamond Corporation.

D *F.25.3672*

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Miscellaneous information : French West Africa : Diamond

Anon. *Miner Tr Notes* 1960 Vol 50 (2) p 27 (Feb)

The production of diamonds by Société Anonyme de Recherches et d'Exploitations Minières en Côte d'Ivoire (SAREMCI) increased from 143,995 cts in 1957 to 145,410 cts in 1958. The diamond deposits are at Tortiya, south of Korhogo in the Ivory Coast. SAREMCI exported 145,940 cts in 1958. SAREMCI continues to search for diamond in the central region of the Ivory Coast. Although some favourable indications in the Bandama, Bou, and Marahoue basins have been discovered, a commercially exploitable deposit has not been found. The Société Diamantifère de Côte d'Ivoire (SODIAMCI), exploiting the mining property of Compagnie du Haut Sassandra (SANDRAMINE), substantially increased its output in 1958 to 19,965 cts ; 11,351 cts were produced in 1957. Exports in 1958 totalled 19,970 carats. SODIAMCI also discovered a small deposit of 4,500 cts in the Kohoné basin, which was reported to be scheduled for exploitation in 1959. The Service of Geology and Mining Prospection prospected for diamond in Senegal near the upper waters of the Gambia River, where diamond indications were discovered. It is also working in the Man region of the Ivory Coast, but positive results have not yet been obtained.

D *Eb.3662*

Carrot for the S.A. diamond industry

Anon. *Min J* 1960 Vol 254 (6497) p 246 (Feb 26)

Discusses the implications of the Precious Stones Amendment Bill which received its second reading in the Union Parliament. Provisions for the alignment of the diamond industry with the gold mining industry on financial matters are considered to be of limited value, but the envisaged opening up of Namaqualand, which is thought to contain potentially diamondiferous areas, is viewed more favourably. Senator J. de Klerk, Minister of Mines, said that production should be stimulated while the demand was high, as there was no guarantee that gemstones would be as much in favour in 100 years as at the present time.

K *F.25.361*

Engelhard Industries

Anon. *Diamond News* 1960 Vol 23 (4) p 17 (Jan)

The Times reports that the London Office of Industrial Distributors (Sales) Ltd recently issued a statement clarifying the agency message from Johannesburg about industrial diamonds in the US. It said that Engelhard Industries Inc has been appointed as an additional distributor of industrial diamonds in the States. It will buy supplies in the normal way from the Central Selling Organisation. Engelhard Industries has been actively researching on problems connected with diamond grit with a view to expanding the uses of this material. This makes it clear, continues the paper, that the arrangement with Engelhard Industries has nothing to do with synthetic diamonds.

See *Industr Diam Abstr* 1960 Vol 17 p A29 (Feb).

D *Fh Qc.342*

Tanganyika's record mining year

Anon. *Min J* 1960 Vol 254 (6499) pp 294-295 (Mar 11)

Review of mining industry during 1959. Important technical progress was made at the Mwadui diamond mine. Alamasi Ltd recovered 33⅓% more diamonds than in 1958. *W* *F.25.364*

The diamond industry of South Africa

D. J. Viljoen. *Suppl Dig S Afr Affairs* Pretoria 1958 fact paper (53), 11 pp, (Feb) ; *Bibliogr Courante* 1959-60 Vol 13 p 129

K *F.12.361*

Continuous process for making synthetic diamond grit developed

Anon. *S Afr Min Engng J* 1959 Vol 70 Pt 2 (3485) pp 1369, 1371 (Nov 27)

A survey of attempts to make synthetic diamond starts with J. B. Hannay's apparent success in preparing crystals in 1880. Sir Charles Parson's duplication of Hannay's methods failed and so it seems did German efforts during the Second World War. The next major development was GEC's success in 1954, after four years of research. Following this, research began in several countries, among them South Africa where De Beers' activities were a closely guarded secret until the successful outcome announced recently. There have also been reports of a Dutch process, still at an early stage, which depends on the use of specially shaped explosive charges to produce the desired pressures. Precise conditions are not yet known. Other reports current are that NV Bronswerk is approaching success in developing a reproducible process for diamond production. Little is known of Philip's work at present, but it is known to have involved techniques different from those employed by GEC or De Beers.

Details are given of the progress of research into synthetic diamond at the Adamant Laboratory. The author stresses that although it is still uncertain that larger stones can be made, it seems safe to assume that De Beers will be in a leading position if this should come about. 2 illustr. *D* *Kl Qc.132*

Progress in the production of synthetic diamonds. Fortschritte in der Herstellung kuenstlicher Diamanten

Anon. *Eurotec* 1960 (5) p 14 (Feb) (In German)

The General Electric process for producing synthetic diamonds can now be considered economically practical. The existing equipment has an annual production capacity of 3,500,000 cts, a value of 36 million Swiss francs. Three Dutch firms, Asscher, Bronswerk, and Philips are also working on the development of new processes.

K *Fh Qc.132*

Synthetic industrial diamonds from South Africa. Synthetische Industriediamanten aus Suedafrika

Anon. *Technica* 1960 Vol 9 (4) pp 167-168 (Feb 12) (In German)

Since September 1958 De Beers has been able to produce synthetic diamonds. Since September 1959 the company has been concerned with the economical production of synthetic diamond powders, whose market price should come to stand at not more than £1 per carat. Increases in production capacity and technical improvements are expected to lead to an expansion of the range of application of such synthetic diamonds. *K* *Fh Qc.361*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND

Mining miscellany

Anon. *Min J* 1960 Vol 254 (6497) p 243 (Feb 26)

The *Rand Daily Mail* reports that rare blue diamonds mined in South Africa may be used as thermistors as they can record temperature changes as small as 1/500th of a degree. They may play an important part in space ships, to record minor changes in temperature and detect radiation, and also in medicine, in giving almost instantaneous temperature readings.

K *F Ud/Fp Wm*

Nitrogen, a major impurity in common type I diamonds
W. Kaiser, W. L. Bond. *Phys Rev* 1959 Vol 115 (4) pp 857-863 (Aug 15)

Common type I diamonds have additional absorption in the infrared and ultraviolet. It is shown that the strongest absorption band in the infrared at 7.8 μ and the ultraviolet absorption at 3065 AU are proportional to the nitrogen content of 0.2 per cent. Concentration, X-ray, and density data suggest that nitrogen occupies a substitutional position in the diamond lattice. The infrared absorption bands at 7.8, 8.3, 9.1, and 20.8 μ are considered to be C-N molecular vibrations. Several optical, electrical, and thermal properties of diamond are discussed in view of the findings. 5 illustr, 53 ref.
A *F Uc*

N.B.S. high-pressure standards programme
Anon. *Instrum Pract* 1960 Vol 14 (2) p 155 (Feb)

High pressure standards and techniques are being studied in the pressure standards programme now being expanded at the National Bureau of Standards. Changes in the properties of materials will be studied to provide more precisely determined calibration points on the pressure scale, and techniques for measuring high pressure will be investigated. One example of changes caused by high pressures is the crystalline change that occurs when graphite becomes diamond. 2 ref.
D *F Ub Vbb.225*

Studies of synthetic diamonds
K. Lonsdale, H. J. Milledge, E. Nave. *Miner Mag* 1959 Vol 32 p 185
D *Fh.21*

Making diamonds
H. P. Bovenkerk, F. P. Bundy, H. T. Hall, H. M. Strong, R. H. Wentorf jun. *Mineralogist* 1960 Vol 23 (2-3) pp 20, 22, 24 (Feb-Mar)

Excerpts from an article on GEC's research work on diamond synthesis.

See *Nature, Lond* 1959 Vol 184 (4693) pp 1094-1098 (Oct 10); *Industr Diam Abstr* 1960 Vol 17 p A3 (Jan).
D *Fh Ha*

Man-made diamonds—from South Africa
Anon. *Carbide Engng* 1960 Vol 12 (1) p 15 (Jan)

Describes experiments at Adamant Research Laboratory leading to the successful production of synthetic diamond abrasive grit. 2 illustr.
D *Fh Qc.361*

The purity of diamonds and their value. Die Reinheit von Diamanten und ihre Bewertung
K. Schlossmacher. *Dtsch Uhrm Zts* 1960 Vol 64 (2) p 54 (Feb) (In German)

The article is extracted from the latest edition of the author's book 'Edelsteine und Perlen.' The purity of diamond, an important factor in determining its value, can be deduced from the inclusions which can be seen with the aid of a lens magnifying 10 times. The inclusions are very rarely of carbon or graphite, as was previously thought. In fact they can be any kind of mineral, and inclusions of diamond have been observed with special interest, while fluid inclusions have also been found. The article includes a table, showing how diamonds are designated according to the number and nature of inclusions observed, and hints are given as to the best means of distinguishing them. 1 table.
K *F Gc/F Gk*

LITERATURE REQUESTS
Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF HARD MATERIALS

How to recognise Fabulite
R. Webster. *Goldsm J* 1960 Vol 66 (492) pp 64-65 (Feb)

Strontium titanite, often known as 'Fabulite', is water-white in colour and thus resembles diamond much more than did synthetic rutile. However, the 'fire' shown by strontium titanite is four times greater than that shown by diamond and these pronounced flashes of colour form the best indication that a stone is not diamond. Other characteristics are compared with those of diamond and methods of identifying these synthetic stones are given. 2 illustr.
D *Bcv Cz/Bcv*F*

Identifying precious stones (XIII). Wir bestimmen Edelsteine (XIII)
Anon. *Gold u Silber* 1960 Vol 13 (2) pp 31-32 (Feb) (In German)

The article discusses the method for discovering whether a stone is doubly or singly refractive. Polarized light is used for this. The stone is placed between the polarizer and an analyzer. If the stone is singly refractive the light behaves as though the stone did not exist, in whatever position it may be placed, and the observer is confronted with complete darkness. With a uni-axial, doubly refractive stone, there may or may not be light, according to the angle of the stone; while with a bi-axial doubly refractive stone there is never complete darkness. 4 illustr.
K *Bb Cz/Bb Ukk*

Synthetic quartz
Anon. *Chem & Ind (Rev)* 1959 (4) p 114; abstr *Mine & Quarry Engng* 1960 Vol 26 (2) pp 90-91 (Feb)

A pilot plant for making synthetic quartz for telephone communication purposes is now in production at Western Electric, North Andover. Advantages over natural quartz are said to be that seeds can be cut to yield grown crystals which may be sawn in the most efficient way, and that the synthetic crystals have natural faces which ease orientation for sawing. The process is described.
D *Bcb*Bcbg/Bcbg Qc*

The relationship between electrical conductivity and electron density distribution in germanium crystals
Yu. N. Shuvalov. *Soviet Phys, Solid State* 1959 Vol 1 (2) pp 187-193 (Feb) (Original in Russian)
6 illustr, 3 ref.
D *Bfr Ue*

Ruthenium
L. Sanderson. *Canad Min J* 1959 Vol 80 (10) p 106-108 (Oct)

Properties and applications are listed.
D *Bfu U/Bfu.1451*

Boron
T. H. H. Skeet. *Mine & Quarry Engng* 1960 Vol 26 (2) pp 60-66 (Feb)

A summary of the occurrence and production of boron minerals with details of present and possible future uses to which this material and its compounds may be put. 5 illustr, 3 tables.
D *Bhz.21/Bhz.13*

The cermets
Anon. *Metal Treatm* 1960 Vol 27 (173) pp 60-62 (Feb)

Properties, manufacture, and applications are discussed. 2 tables.
D *Blf*

Beryllium—the metal and its design potential

F. M. Yans, N. R. Gardner. *Elect Mfg* 1959 Vol 64 (5) pp 181-187 (Nov)

Applications of beryllium are in structural and mechanical, nuclear, thermal, and electrical fields. Properties, design considerations, and application are discussed as are difficulties to be met when machining the metal with carbide tipped tools. 8 illustr, 4 tables.

A *Bfu U*

On the elastic properties of neutron irradiated quartz

G. S. Zhdanov, V. G. Zubov, A. T. Ivanov, M. M. Firsova. *Sov Phys, Crystallogr* 1960 Vol 3 (6) pp 726-730 (Jan) (Original in Russian)

4 tables, 11 ref. *D* *Bd Qvc Uuc*

Mode of vibration of double-convex quartz lenses of AT crystals

M. I. Iaroslavskii, P. G. Posniakov, I. G. Vasin. *Sov Phys, Crystallogr* 1960 Vol 3 (6) pp 774-776 (Jan) (Original in Russian)

5 illustr, 1 ref. *D* *Bcb Tfb:Qn*

Gems and precious stones clearly defined. Edel- und Schmucksteine klar definiert

Anon. *Glas-Email-Keramo Techn* 1960 Vol 11 (2) p 54 (Feb) (In German)

K *Bb Cz*

Crystal structures, Supplement IV

R. W. G. Wyckoff. *Econ Geol* 1959 Vol 54 (7) pp 1326-1327 (Nov)

Book, Reinhold Publishing Co, New York. 1959, 400 pp, looseleaf. Price $22.--.

[Not in library of Industrial Diamond Information Bureau]. *D* *Ubb.52*

Theory of the lattice vibrations of germanium

W. Cochran. *Proc roy Soc A* 1959 Vol 253 p 260; *Insdoc List* 1960 Vol 7 (1) col 13 (Jan 1)

D *Bfr Ubb.21*

Swiss P 339,705 **H. Flad, W. Knoll, L. Meurer von Inffeld, Simili, Fabrik feiner Schleifprodukte** (Sep 29, 1954—conv date, Austria)

Ornamental stone consisting of transparent non-precious material. Aus einem durchsichtigen, unedlen Werkstoff bestehender Schmuckstein

On the parts of the surface away from the incident light, the stone has a thin continuous coating of such a quality that only part of the light penetrating the stone is reflected towards it, while the remaining light, apart from the loss by absorption, can emerge again from the stone. The layer may be a part-permeable coating of high-reflecting metal (silver, chromium, rhodium) or a metallic composition (metal oxide, metal sulphide or metal fluoride), and may be protected by a thin silicon oxide coat. (7 claims, 1 illustr).

J *Bb.193:Ukc.545*

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 54s 6d, post free.

DIAMOND, ETC, IN INSTRUMENTS

Jewel bearings

Anon. *Design News* 1959 Vol 14 (24) pp 24-25 (Nov 23)

A practical coefficient of friction for steel pivots and sapphire jewels is 0.15. Synthetic sapphire is most widely used, borosilicate glass is used for very light systems of not more than 0.75 g, and tungsten carbide for special applications. Cost and fabricating limitations prevent the use of diamond, except where wear in the thrust load direction on endstones is critical. Lubrication, assemblies, concentricity, and a high degree of surface finish must be considered for satisfactory production. 8 illustr.

A *Tc.21*

A new glass spectrograph

H. Scheller. *J sci industr Res* 1959 Vol 18A (11) pp 504-506 (Nov)

5 illustr, 2 tables. *D* *Bm Cz Wcp*

Diffraction grating measurements

R. W. Wilde. *Electron Engng* 1959 Vol 31 (379) pp 558-559 (Sep); *Instrum Abstr* 1959 Vol 14 (11) p 337 (Nov)

D *Tfd V*

Instrument for measuring rolling friction

A. S. Vagrumjan. *Vestn Masstro* 1959 Vol 39 (11) pp 28-29; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (12) p 1018 (Dec) (In German, original in Russian)

K *Ung V W*

X-ray diffraction by single crystals at low temperatures: a cryostat for use with liquid hydrogen

J. H. Robertson. *J sci Instrum* 1960 Vol 37 (2) pp 41-45 (Feb)

5 illustr, 7 ref. *D* *Bd Uklb*

Crystal oscillation mechanism for use with automatic X-ray diffractometers

U. W. Arndt, T. H. Faulkner, D. C. Phillips. *J sci Instrum* 1960 Vol 37 (2) pp 68-69 (Feb)

2 illustr. *D* *Bd Wcez*

Velocity gauge

Anon. *Metalworking Prod* 1960 Vol 104 (6) p 5 (Feb 10)

Moiré-fringe technique has been developed for measuring the variation in ram velocity of a shaping machine during cutting. Gratings with 500 lines/in. are used. The pulses are shaped to a constant width and constant amplitude, and fed into an integrating circuit and bridge rectifier to produce a.d.c. voltage proportional to the repetition frequency of the pulses. This voltage is recorded as a velocity/time curve.

D *Wbbz*

Use of the spindle stage for determination of principal indices of refraction of crystal fragments

R. E. Wilcox. *Amer Min* 1959 Vol 44 (11-12) pp 1272-1293 (Nov-Dec)

A small crystal or crystal fragment, mounted on the tip of a spindle in a suitable holder on the polarizing microscope stage, may be oriented quickly and accurately for measurement of all its principal indices of refraction by the immersion method. Independent measurements or estimates of other properties, such as optic angle, optic sign, dispersion, pleochroism, and the relation of the indicatrix to cleavage or crystal faces may be made on the same fragment. 5 illustr, 28 ref, 1 table. *D* *Az Bd Ukk*

Metal physics

Trueb, Taeuber & Co Ltd, Zurich. *Metal Ind, Lond* 1960 Vol 96 (7) pp 133-134 (Feb 12)

Problems in crystallography, physics, and metallurgy can be solved by using the basic Trueb Taeuber electron diffractograph KD 3 with standard components, it is claimed. 1 illustr.

See also *Physical Society; Handbook of Scientific Instruments and Apparatus,* 1960, p 341.

D *Sb Uc*

Wild Heerbrug measuring microscopes

Wild Heerbrug Ltd, Heerbrug, Switzeralnd. *Machinery, Lond* 1960 Vol 96 (2467) p 419 (Feb 24)

The GM 1 thread measuring microscope is primarily intended for checking thread profiles, setting thread grinding machines, and for the supervision of thread cutting operations. The Wild WM 1 microscope for precision angle measurements is for use in the production of gauges and tools, and is said to enable the angles of form cutters, angle gauges, gears and threads to be measured quickly and easily. 2 illustr.

D *Pr Psc Wcm*

Surface finish measuring microscope

Hilger & Watts Ltd, 98 St Pancras Way, Camden Rd, London NW 1. *Mech World* 1960 Vol 140 (3487) p 62 (Feb)

A surface finish microscope is an interferometric instrument for measuring the depths of surface irregularities direct to the millionth part of an inch.

D *Unf Vwcm*

Application of a 400 kev electron-diffraction apparatus to the study of single crystals

N. M. Popov, B. B. Zviagin. *Sov Phys, Crystallogr* 1960 Vol 3 (6) pp 712-715 (Jan) (Original in Russian)

4 illustr. *D* *Bd.21*

Do not give up all hope. Nicht alle Hoffnungen aufgeben

Anon. *Dtsch UhrmZts* 1960 Vol 64 (2) p 67 (Feb) (In German)

Watch jewels play the same role as ball bearings in a bicycle. Up to 28 stones can be used in a watch but more than 15 to 17 are unnecessary and the number of stones used is not necessarily an indication of the quality. *K* *Tc*

Recording spectrophotometer. Registrierender Spektrophotometer

Unicam Instruments Ltd. *Industriekurier* 1960 Vol 13 (25) p 105 (Feb 17) (In German)

K *Wcq*

HARDNESS AND WEAR TESTING

A new ceramic material possessing promising industrial properties : Pyroceram. Une nouvelle céramique aux propriétés industrielles prometteuses : le Pyroceram

Anon. *Mach Mod* 1960 Vol 54 (611) pp 9-12 (Feb) (In French)

This new material was tested by means of the Vickers hardness testing apparatus using diamond indenters, giving a hardness of 639 under 500 g pressure, corresponding to a hardness of 550/850 for treated steel tools. 5 illustr, 1 table.

K *Blz Cvd Nd Wghc*

Roughness in centreless grinding. Rugosité de rectification centerless

L'Abbé Cayere. *Mach Mod* 1960 Vol 54 (611) pp 29-37 (Feb) (In French)

Experiments were carried out to determine the amount of surface wear caused in centreless grinding. The most abrupt roughness profiles are illustrated. It was concluded that the average roughness is in the range of a micron, and that the filtering of the coolant is of great importance, as impurities may cause tears of between 2 and 10 μ and small facets several microns deep. Although a sapphire was used to trace the grooves, the writer feels that a natural octahedron diamond would be less subject to wear and yet not be too blunt to trace the surface grooves. 21 illustr.

K *Chcc Unf/Cx Nde*Cx Tdb*

A report on the 3rd International Conference on Hardness Testing in Theory and Practice. Bericht ueber die 3. Internationale Arbeitstagung Haertemessung in Theorie und Praxis

W. Dutschke. *Werkstattstechnik* 1960 Vol 50 (1) pp 34-36, 37-40 (Jan) (In German)

Among papers given were : 'New principles of design in the construction of permanent and portable hardness testing apparatus of the Rockwell, Brinell and Vickers type' by A. Ernst, Italy ; 'New shapes in diamond indenters of the HRC type' by F. Fromholt, France ; 'The relative movement of the diamond in its setting' by W. Stuhlmann, Berlin ; and 'A process of the examination of conical or pyramid-shaped diamond points developed in the USSR', by Dr. Warnello, USSR. Summaries were given of papers on : 'A newly developed microhardness testing device' by Yamamoto, Japan, and 'The application of interference processes and Guild's process in the testing of Rockwell diamond indenters', by M. Tamano, Japan. 11 illustr, 1 table.

K *Cv.231.31*

Dimensional wear of tools

E. V. Ryzhkov. *Machines & Tooling* 1959 Vol 30 (10) pp 36-37 (Oct) (Original in Russian)

The influence of the cutting path on the dimensional wear of the tool equipped with various grades of carbide is described. 3 illustr.

D *Pdc Unr*

Decarbonization in steel wires. Die Entkohlung bei Stahldraehten

P. Fischer. *Drahtwelt* 1960 Vol 46 (2) pp 85-93 (Feb) (In German)

The article deals with the effects of carbon deficiency in steel wires. The Vickers method of hardness testing using diamond indenters was used to determine the effect of carbon deficiency on surface hardness, and the results of the experiments are discussed. 28 illustr, 14 ref. *K* *An Bfd Cv Nd*

Failure mechanisms of solid propellant rocket nozzles

Y. Baskin, T. A. Greening, M. J. Kemp. *Bull Amer ceram Soc* 1960 Vol 39 (1) pp 14-17 (Jan)

The 25 refactory materials evaluated include graphite, silicon carbide and silicon nitride. Failure mechanisms presented for the more satisfactory materials, were determined by chemical, microscopic, and X-ray diffraction analysis. 1 illustr, 6 ref, 2 tables.

D *Ba Cz*

Indentation strength of glass

A. S. Argon, Y. Hori, E. Orowan. *J Amer ceram Soc* 1960 Vol 43 (2) pp 86-96 (Feb)

The tensile strength of plate and sheet glasses was investigated by means of indentation experiments with small spherical indenters. 16 illustr, 18 ref.

D *Bm Cvd/Bm Unlc*

The routine evaluation of raw titanium

P. S. Crowther, H. Bradley. *Metallurgia* 1959 Vol 60 (362) pp 287-292 (Dec)

An account is given of a procedure developed for the routine evaluation of raw titanium by hardness tests on arc-melted buttons. Diamond pyramid hardness has always been used for button evaluation by ICI. The relative merits of diamond pyramid and Brinell tests have often been reviewed and the former retained as a result, mainly because a relatively small flat only is needed, and the manipulation is easier. The technique is described. 5 illustr, 3 ref, 2 tables.

D *Bfn Cvd Nd*

Ablation materials . . are good for ultra-high-temperature applications, recent tests show

G. J. Miller (Aeronutronic Div, Ford Motor Co). *SAE J* 1959 Vol 67 (12) pp 52-54 (Dec)

Abstract of paper by M. A. Schwartz, W. Bandaruk. Materials tested included graphite (solid and (siliconized) and boron nitride (solid). 4 illustr, 1 table.

D *Bhb.1312/Bhz.1312*

Testing the wear resistance of metal surfaces. Zur Pruefung der Verschleissfestigkeit metallischer Oberflaechen

R. Weiner. *TZ Tech Zentralbl* 1960 Vol 54 (1) pp 1-6 (Jan) (In German)

Discusses various current methods of testing the wear resistance of metal surfaces. The writer claims that the indentation hardness and scratch hardness of a metal surface are only loosely related to its resistance to wear, and therefore condemns the use of such processes as Vickers hardness testing for determining wear resistance. Special wear resistance tests, taking account of the conditions met in practice, are indispensible. 2 illustr, 9 ref, 4 tables.

K *Az Bf Cx*

Effect of core-hole size on tapping torque and thread strength

Production Engineering Research Association. *Metalworking Prod* 1960 Vol 104 (8) pp 346-347 (Feb 24)

A report of investigations into the effect of core-hole size and depth, or length, of thread in various metals on tapping torque and strength of threaded assemblies. 3 illustr, 1 table, 3 ref sheets.

D *Az V W*

Equipment and methods developed at the 'Laboratoire Suisse de Recherches Horolgères' and their industrial application

G. Nowicki. *Microtecnic* 1959 Vol 13 (6) pp 298-304 (Dec) (In English)

Includes a description of a device for positioning Rockwell hardness test impressions, useful not only for checking dial pressing tools, but also the hardness of small parts of complicated shape, and of cylinders, or rings. The device protects the indenter diamond against damage that could occur if the diamond were moved inadvertently along an edge of an insufficiently centred part. 16 illustr, 2 ref.

D *Nd:Cz Psc*

Special machines for automatic hardness testing. Sondermaschinen fuer die automatische Haerteprueфung

K. Potyka. *Werkst u Betr* 1960 Vol 93 (3) pp 138-140 (Mar) (In German)

Examples are given showing various ways in which problems arising from the shape or size of testpieces in series production have been solved by a suitable combination of standard test automatics or by special hardness testing. 7 illustr.

K *Wgh.133*

Selected extracts from the 4th Production Engineering Research and Design Symposium—'Machine Tools and Technical Knowledge'. Ausgewaehlte Abschnitte aus dem 4. Fertigungstechnischen Forschungs- und Konstruktions-Kolloquium 'Werkzeugmaschinen und Betriebswissenschaft' (Fokoma)

W. Decker. *Werkstattstechnik* 1960 Vol 50 (2) pp 89-94 (Feb) (In German)

Papers included: 'The relation between materials used and the wear on sintered carbide lathe tools' by G. Ostermann; and 'Wear experiments conducted under machining conditions' by M. Busching.

K *Pdc Unr*

A simplified method of calculating Brinell hardness. Eine vereinfachte Berechnung der Brinellhaerte

R. Boeklen. *Z Ver dtsch Ing* 1960 Vol 102 (4) p 128 (Feb 1) (In German)

Brinell hardness can be determined in a simple manner from the diameter of impression, by working out the Meyer hardness and subtracting a corrective factor which depends solely on the load applied.

K *Cz Unhcb.1456*

Physical metallurgy : developments in research techniques

G. A. Geach. *Metal Treatm* 1960 Vol 27 (173) pp 67-70 (Feb)

Topics covered include low temperature work, creep under constant shear stress, hardness testing at high temperature, direct observation of dislocation, and X-ray micro-analysis. 11 ref.

D *Um Vwl.131*

New micro hardness tester

Torsion Balance Co, Clifton, NJ. *Grinding & Finishing* 1960 Vol 6 (1) pp 64-65 (Jan)

A new micro hardness tester, Kentron Model AK 8, with a vertical capacity of 8 in., applies dead weight loads from 1 to 1,000 grams. Additional weights for loads up to 10,000 g can be supplied. This model is basically a production control instrument, specially developed to test unmounted parts, but also suitable for mounted specimens, small parts, wire, *etc.* 1 illustr.

D *Wghd*

Hardness testing

Anon. *Metal Treatm* 1959 Vol 26 (161) pp 60-62 (Feb); *BSCRA Abstr* 1960 Vol 9 (1) p 31 (Jan)

Summary: It is desirable to achieve a means of international comparison of hardness values obtained by the various test methods at present in use. This short article from *Export Anzeiger* E 5/58, summarizes the most important test methods, and goes on to discuss progress already made towards obtaining comparability between methods. *X* *Cv.1456.21*

Progress in micro-indentation hardness testing

H. Buckle. *Metallurg Rev* 1959 Vol 4 (13) pp 49-100; *Instrum Abstr* 1959 Vol 14 (8) p 271 (Aug)

D *Wghcz.132*

The use of the micro-hardness method in determining the kinetic characteristics of dendrite segregation

G. A. Korol'kov, I. I. Novikov. *Izv Akad nauk SSSR Otd techn nauk Metallurg i Topl* 1959 Vol 3 pp 70-74; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (11) p 934 (Nov) (In German, original in Russian)

Experiments showed that the micro-hardness method is satisfactory for determining the kinetic characteristics of dendrite segregation and is in fact preferable to that of quantitative autoradiography.

K *Bdz Cvdb Unz*

USP 2,903,887 (June 20, 1955) **R. F. Taber**

Instrument for testing properties of materials

The tester operates with a diamond or carbide tool rotating alternately in opposite directions, the penetration at a certain load and at a certain number of revolutions being indicated on the indicator dial. In this way, comparative tests are made to show relative degrees of toughness, hardness, *etc*, of various materials such as aluminium, steel, glass, carbon, plastics, porcelain or, *eg* of grinding wheels. Fig 1 is a plan view of the tester, Fig 3 and 4 show a diamond "penetrator", Fig 5 is a carbide penetrator. Rotation

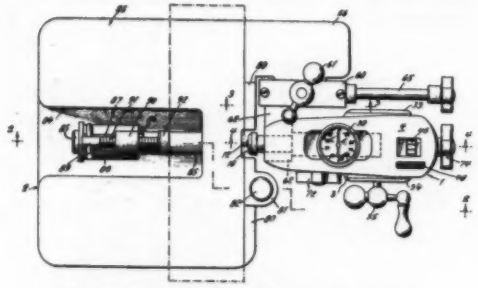
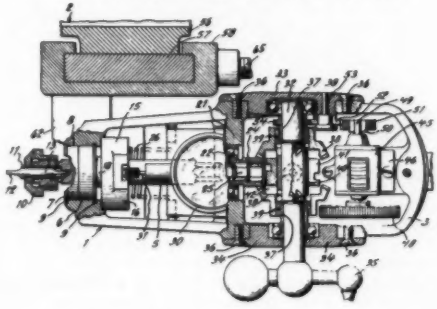


Fig 1 (above). Plan view of the tester.

Fig 2 (below). Horizontal cross section.



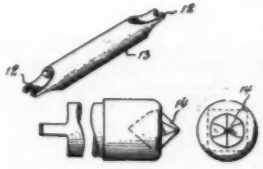


Fig 3 and 4 (left, below). A diamond penetrator. Fig 5 (left, top). A carbide penetrator. USP 2,903,887.

derives from a cam shaft 32 with cam 41 seen in Fig 2 through clutch sleeve 41 and gears 38 which will rotate alternately main shaft 5 with penetrator 12 pressed down by spring 26. A conventional indicator 30 registers the longitudinal movement of plunger 31. (12 claims, 11 illustr). Ref cited : 2 USP ; 1 GP.

J *Cvd Nd Wghc.545*

REQUESTS FROM AMERICA

American readers who wish to order a photostat or reprint of an article abstracted in Industrial Diamond Abstracts are advised to apply directly to the appropriate journal if this is an American publication.

TRUING OF GRINDING WHEELS

Copy grinding machine. Kopierschleifmaschine

Anon. *Industr Anzeig* 1960 Vol 82 (10) p 152 (Feb 2) (In German)

This machine, in which two grinding wheels are used at the same time, enables the simultaneous machining of two exactly identical profiles from a five times enlarged template. As soon as the copying stylus comes into contact with the three-point truing template, an exact reduced copy of the profile is transferred to each grinding wheel by three truing diamonds whose position corresponds to the three points on the template. A cylindrical grinding attachment for round workpieces can also be fitted. 2 illustr.

K *Ab Cgf Njd/Chcz Pr Tdb*

Truing devices for profile grinding oblique spur wheels. Abrichtgeraete fuer das Profilschleifen von Schraegstirnraedern

G. Niemann, J. Looman. *Z Ver dtsch Ing* 1960 Vol 102 (6) pp 231-238 (Feb 21) (In German)

The accuracy of the wheel depends to a great extent upon the profile of the grinding wheel, and as a result upon the truing device. The article sets out principles which should be taken into consideration when dealing with a fully or semi-automatic truing device and discusses different processes. 35 illustr, 9 ref.

K *Abz Cgf Psf*

Thread grinding. Ueber das Schleifen von Gewinden

A. Leuschner. *TZ prakt Metallbearb* 1960 Vol 54 (1) pp 7-10 (Jan) (In German)

A detailed discussion of the principal methods of thread grinding. Single profile grinding is necessary where a high degree of precision is required, whereas multiple profile grinding is in general more economical. Multiple profile grinding wheels are trued with the aid of a profiling cylinder of hardened tool steel, but for single profile grinding wheels guided diamond truing tools are used, usually without any reduction in the speed of the grinding wheel. 11 illustr.

K *Chcp*

Profile face grinding on horizontal face grinding machines. Das Profilflachschleifen auf Horizontal-Flachschleifmaschinen

R. Blohm. *TZ prakt Metallbearb* 1960 Vol 54 (1) pp 11-16 (Jan) (In German)

The article compares various methods of truing grinding wheels used in profile plane grinding. In spite of the greater expense, diamond copying machines save time and require less skilled labour. For a high degree of accuracy with complicated shapes, the Diaform machine is especially recommended, as it uses a bit-shaped diamond and a greatly enlarged template. A series of examples of individual processes is also described. 15 illustr.

K *Ab Cgf Nj/Chch Pr*

Large internal grinders. Gross-Innenrundschleifmaschinen

Anon. *Technica* 1960 Vol 9 (5) pp 211-214 (Feb 26) (In German)

In a general article on the peculiarities of large internal grinding machines, truing methods are discussed. The truing diamond is brought into position by hydraulic means and is adjusted by a micrometer screw. In order to maintain a constant working position, the swivel arm of the truing device is held in a pre-stressed bearing. 15 illustr.

K *Chcn Pr:Nj Psfb*

J. & S. spline grinding attachment

A. A. Jones & Shipman Ltd, Narborough Rd South, Leicester. *Metalworking Prod* 1960 Vol 104 (8) p 349 (Feb 24)

Special equipment fitted to a standard model 540 surface grinder, for grinding the radius at the bottom of four spline shafts, operates with a formed wheel and automatic indexing of the component through 90° each time the machine table moves to the right and brings the grinding wheel clear. A wheel truing device consists of a mandrel carrying a diamond, which is set to the required radius for the mandrel to be mounted between centres and swung through an arc to form the radius on the periphery of the wheel. Collars are produced for setting the diamond. 1 illustr.

D *Ab Cg Nj/Agz Chc Psc*

Adjustable diamond mounts make for improved truing of grinding wheels. Verbessertes Abrichten von Schleifscheiben mit verstellbarem Diamanthalter

Anon. *TZ prakt Metallbearb* 1960 Vol 54 (2) p 85 (Feb) (In German)

If a rigid diamond mount is used, truing becomes less efficient as soon as the diamond point is worn and the diamond works less accurately with a resulting loss in the cutting quality of the grinding surface. With an adjustable mount, however, such as the one described in the article, the newly formed edges of the diamond can be brought into operation. 1 illustr.

K *Ab Cg Mfb Nj*

Thread grinding machines. Gewindeschleifmaschinen

H. Lindner GmbH, Berlin-Wittenau. *Drahtwelt* 1960 Vol 46 (2) p 105 (Feb) (In German)

Describes a machine for grinding a wide range of workpieces. Three automatic manufacturing processes are possible. One-way long grinding and pendulum long grinding, for both of which either a single or multiple profile grinding wheel can be used, and automatic plunge grinding for which a multiple profile wheel is used. In one-way long grinding with a single profile wheel, truing is carried out with a diamond truing device during the rapid return motion. When grinding with multiple profile wheels this is impossible, as the wheel is stopped during the return motion, but here too the complete truing process is compensated. 1 illustr.

K *Abmb Cg Nj/Chcp Pr*

Accuracy of shape and proportion in circumference plunge grinding. Form- und Massgenauigkeit beim Aussenrund-Einstechschleifen

P. H. Brammertz, E. Kohlhage. *Industr Anzeig* 1960 Vol 82 (10) pp 143-150 (Feb 2) (In German)

Experiments were conducted to examine the influence of machining conditions and the machine tools used on accuracy of shape and proportion in circumference plunge grinding. The grinding wheel used in the experiments was trued at a table speed of 168 mm/min (corresponding to a feed of 0.1 mm/rev of the grinding wheel). The truing diamond was used, twice with a feed of 0.05 mm and once with no feed, and the table speed as given above. 22 illustr, 5 ref.

K *Chcd.21*

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone". The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd, 226 Latymer Court, London W 6. 54s 6d, post free.

USP 2,897,634 (Nov 27, 1953) **E. Wildhaber**

Method and apparatus for producing helical gears

When grinding both sides of a helical tooth space simultaneously, it has been impossible to maintain balanced grinding pressures during the full length of the cut. Grinding continues on one side and ceases on the other so that the wheel tends to spring away from the surface being ground, leaving more stock on the back end of the tooth. Balancing of the pressures has been achieved by moving the wheel in a plane inclined to the axis of the blank and in which the wheel centre travels in a path concave towards the blank. The wheel remains in contact with both sides of the tooth space until leaving the tooth. Fig 9 shows a device for the simultaneous truing of opposite sides of a wheel. The

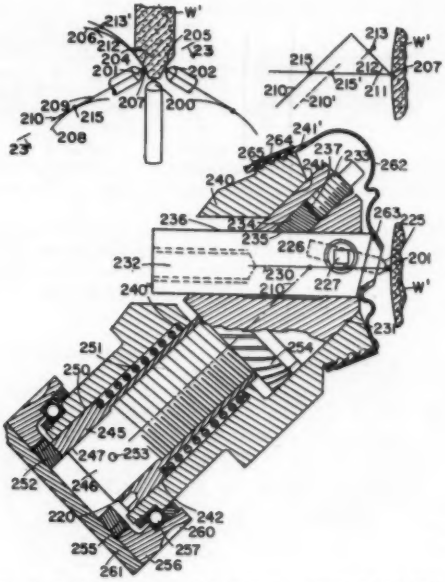
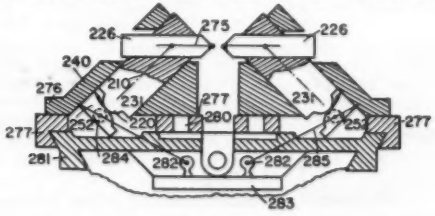


Fig 6, 7, 8 (above) and 9 (below). USP 2,897,634.



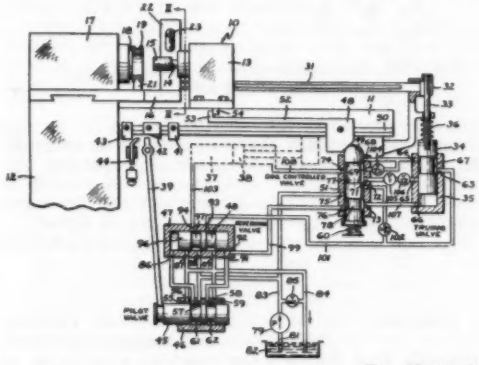
principle of operation of the truing mechanism is shown in Fig 6, an axial section of the truing device in Fig 8. In Fig 6, diamond 200 merely serves for truing the periphery of wheel W'. Diamonds 201 and 202 are guided so that their points pass along non-circular curve 204 having an evolute 208. The diamond point is turned about axis 210, also shown in Fig 7 inclined at an acute angle to the wheel surface and passing through the mean normal 209. The direction of motion at point 207 lies in an axial plane of the wheel. The axial motion of the diamond is controlled by cam and follower, 252 and 220 in Fig 9, which shows a device for the simultaneous truing of opposite sides of a wheel. (25 claims, 30 illustr). Ref cited : 7 USP.

J *Ad Cff:Alc Ceqg.545/Ad Chc:Ab Cgf.545*

USP 2,903,827 (Apr 25, 1957) **H. L. Blood**
Heald Machine Co

Grinding machine

In many operations, in particular internal grinding, it is desirable to true the grinding wheel before completing the grinding cycle by the passage of a diamond. For this purpose the wheelhead is moved a certain distance often requiring a long wheel spindle followed by a number of passages of the diamond across the wheel. These drawbacks can be avoided by an arrangement of the diamond holder as shown in Fig 10, 11 and 12. When table 11 is stopped, diamond 23 moves



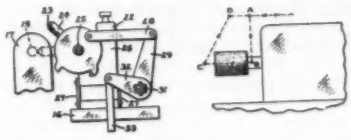


Fig 10 (top), 11 (left), and 12. USP 2,903,827.

into operative position in the path of wheel 15. The table is then moved so that the wheel passes across the diamond at slow speed. At the end of the movement the diamond returns into inoperative position, and when the diamond is out of the path of the wheelhead the table carries the wheel past the diamond holder. The relative positions of diamond and wheel are represented by A, B, C, D in Fig 12. (9 claims, 6 illustr). Ref cited : 2 USP. *J Chcn Pr:Nj Psf.545*

USP 2,904,029 (June 2, 1958) **N. Hoglund**

Apparatus for forming contours

The truing device is designed to occupy less space than previous devices, so as not to interfere with the shielding of the grinding wheel and the handling of the machine. Fig 13 is a front perspective of the device, Fig 14 a vertical section showing tool 59 in contact with wheel face 77, Fig 15 another vertical section. Main slide 30, operated by a hydraulic mechanism, carries on its upper surface contour cam 35, on its lower surface feed cam 36. Follower 40 on slide 41 controls the movement of the housing 21 on base 20.

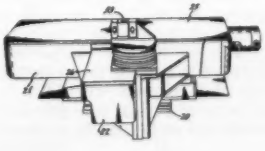


Fig 13. A front perspective of the device. USP 2,904,029.

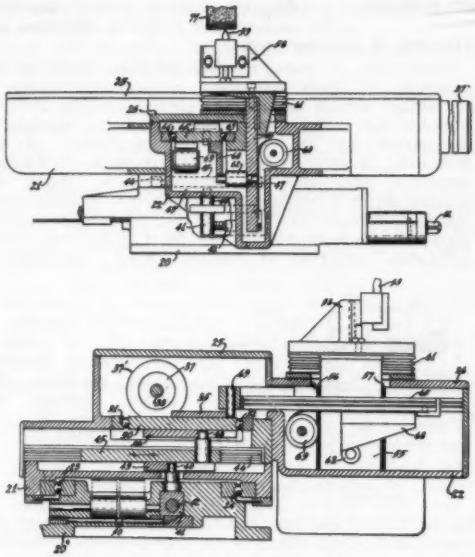


Fig 14 (top) and 15. Two vertical sections of the apparatus. USP 2,904,029.

Intermediate slide 45 carries follower 48 in contact with feed cam 36 and ratio cam 49. Tool slide 55 carries follower 62 for the controlling of the vertical movement of the slide through ratio cam 68. (10 claims, 6 illustr). *J Ab Cg Psf.545*

Swiss P 339,529 **R. A. Mahlmeister, Sheffield Corp**
(Jan 29, 1954—conv date, USA)

Method of profiling a ribbed grinding wheel and grinding wheel produced by this method. Verfahren zum Profilieren einer gerippten Schleifscheibe und nach dem Verfahren hergestellte gerippte Schleifscheibe

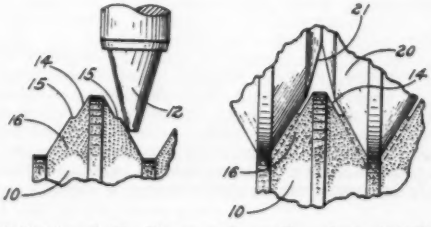


Fig 16 (left) and 17. The crushing roller. Swiss P 339,529.

Diamond truing means cutting off the points of abrasve particles in the grinding face of the wheel, leaving the surface only slightly porous. The wheel gets hot easily and grinding is consequently slow. When truing by crushing, abrasive particles are broken out of the face, developing many sharp edges and producing porous areas between particles. Grinding can be fast as the heat developed is readily dissipated. The ribbed wheel is trued correctly with a diamond at its outer periphery, while the inner part is left with some material to be removed finally by a crushing roller as shown in Fig 16 and 17, which however does not operate on the correctly trued outer part. (7 claims, 5 illustr). *J Abz Cgf Nj.545*

USP 2,905,605 (May 19, 1953) **G. F. Keeleric, L. A. Williams jun**

Dressing of abrasive tools

When using a metal-bonded grinding wheel as an electrode for spark machining, proper conditioning of its surface means maintaining correct spacing distance between the metal of the wheel and the workpiece, determined by the amount of protrusion of the insulating abrasive particles. The method of dressing described here uses an electric action. When the spacing distance becomes smaller than a predetermined distance, between 0.001 and 0.1 in., the voltage applied across the workpiece and the tool is raised and causes substantial sparking to remove "load" accumulated

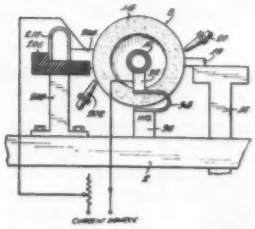


Fig 18. A general arrangement showing truing electrode 204 under pressure of spring 10. USP 2,905,605.

on the face of the tool, and to remove a portion of the metal bond from the tool to expose again insulating abrasive particles. Thus a correct spacing distance is re-established. The particles may be diamond, or softer particles of smaller grit size than usual (275-400), as the electrolytic dressing technique permits much better control than mechanical truing. Fig 18 shows the general arrangement of a machine with a (tungsten carbide) truing electrode 204 under slight pressure of spring 10 on insulating guide 206. (1 claim, 4 illustr). Ref cited : 5 USP ; see also USP 2,826,540 ; 2,368,473.

J *Ceqm Pr:Nje Psf.545*

Swiss P 339,530 **L. O. Carlsen, W. C. Critchley, H. Pedersen, Gleason Works**

(Sep 7, 1954—conv date, USA)

Grinding machine for toothed articles. Machine à meuler des organes compartant des dents

The truing device is movable in the direction of one of the generatrices of the conical grinding wheel at right angles to the grinding head, which itself is movable in the direction of another generatrix of the conical surface of the grinding wheel at right angles to the support of the head. This direction corresponds to the axis of the support. Those two movements are interdependent and controlled by a cam on the support and a follower moving with the truing device. The machine has two grinding wheels, each of which is provided with a truing device shown in Figs 19 and 20.

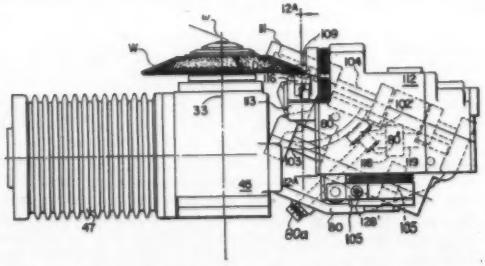


Fig 19. Diagram showing provision of a truing device. Swiss P 339,530.

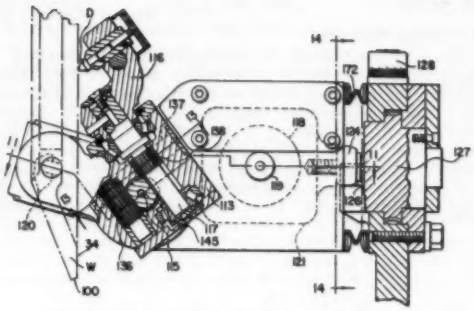


Fig 20. Another view of the truing device. Swiss P 339,530.

Control is effected by follower 109 on cam 111 moving carriage 105 on which the truing device is mounted. The movements may be hydraulically operated and electrically controlled so as to produce an audible or visible signal indicating to the operator that the wheel is worn and must be replaced. (9 claims, 21 illustr).

J *Ab Cg Psf.545*

DAS 1,062,569 (Mar 29, 1958) **E. Volkmar, VEB Fraes- u Schleifmaschinenwerk**

Automatic feed for grinding machine slide ways of automatic grinding machines. Selbsttaet.ge Beistellvorrichtung fuer Schleifschlitten von den die Maschine verlassenden Werkstuecken messgesteuerter Schleifmaschinen

The automatic feed is intended to compensate for the continuous wear of the grinding wheel and the reduction of its dimensions by the periodic application of the truing diamond. Truing feed and measuring control feed are independent so that a special device is required to effect the compensatory truing feed. This is achieved by feeding the carriage, after each truing step, a distance equal to the measuring control feed minus the diamond feed. The mechanism consists of two ratchet wheel drives turning the feeding spindle. The second drive is derived from the constant feed of the diamond resulting in a corresponding adjustment of the turning angle of the first drive. (5 claims, 3 illustr). Ref cited : 1 GP ; 4 USP.

J *Chcl Pr.545*

PRECISION MACHINING OF METALS

Forming and fabrication of yttrium metal

General Electric at Aircraft Nuclear Propulsion Dept. *Tool Engr* 1960 Vol 44 (1) pp 200-201 (Jan)

Describes development work in forming and fabricating yttrium, a rare metal which has substantially increased its usefulness. Experience in machining this metal indicates the following points : (i) yttrium is hazardous to machine because of its tendency to burst into flame : therefore chips must be kept large and separated ; (ii) in lathe work, dry cutting is preferred. Tool steel and carbide tools may be used ; (iii) HSS or carbide-tipped drills can be used ; (iv) for grinding yttrium, either a water-soluble oil or a high-flash point oil should be used. *D* *Bfu Ceq*

Milling nominic alloys

Anon. *PERA Bull* 1960 Vol 13 (1) pp 3-5 (Jan)

The PERA report, 'A summary of information on milling nimonic alloys', which is now available to member-firms, summarizes information on 35 typical milling operations carried out in various companies. The information given is based almost entirely on milling operations on turbine components manufactured from Nimonics 80, 80A, 90 and 100.

D *Bfxl Cff*

Investigations of carbides for machining stainless steel

N. P. Golubev. *Machines & Tooling* 1959 Vol 30 (10) pp 42-43 (Oct) (Original in Russian)

The life of tools tipped with VK8 and T5K10 carbide when machining the stainless steels and heat resisting alloy investigated, exceeds the life of R18 HSS tools by 10-15 times. 3 illustr.

D *Bfdg Ceq Pdc Uqe*

Turning metals with vibratory cutting tools

V. H. Podurayev, Yu. E. Zaharov. *Machines & Tooling* 1959 Vol 30 (12) pp 11-16; *Engrs Dig* 1960 Vol 21 (2) pp 89-92, 98 (Feb) (Original in Russian)

In general, it may be said that vibrations contribute to an increase in tool life. For instance, during tests, a round-nosed tool tip failed after 22.2 min of conventional cutting, while the same type of tool tip remained sound after 28.2 min of vibratory cutting under identical conditions. Similar results were obtained with other types of tool tips. Apparently, in all these cases, variations in speed, feed, and direction of cutting change the character of plastic deformation of the machined metal and have a beneficial effect on tool life. Also, these factors tend to reduce the load on the cutting edges—an effect similar to that observed during the ultrasonic machining of metals. 9 illustr.

D *Bf Ceqb Qn*

The extent to which accuracy in producing workpieces by means of turning with sintered carbide bits is affected by heating

A. M. Danieljan, I. P. Parsin. *Vestn Masstro* 1959 Vol 39 (10) pp 38-42; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (11) p 926 (Nov) (In German, original in Russian)

The article discusses the effect of thermal influences on both cutting tool and workpiece. Sintered carbide tools of 20 × 20 × 100 mm and thin walled castings with a length of 95 mm, internal diameter of 123 mm, and external diameter of 135 mm, were used. Distortion increases in proportion to the depth of cutting. Therefore, the highest possible cutting speed and thrust should be combined with the lowest cutting depth.

K *Ceqb Pdc Ud*

Heller SBR automatic turret drill

Wickman Ltd, Fletchamstead Highway, Coventry. *Metalworking Prod* 1960 Vol 104 (8) pp 348-349 (Feb 24)

This machine was developed for carrying out automatically a series of operations on small and medium batches of components without jigs. It has up to six radial spindles in a turret, mounting tools for drilling, counterboring, reaming, tapping, and light boring and milling. 2 illustr.

D *Cfb Prs*

Split point for drilling

Anon. *Automatic Mach* 1959 pp 55-56 (Oct); *PERA Bull* 1960 Vol 13 (1) p 11 (Jan)

Presents methods for increasing drill performance when drilling the super-strength alloys.

X *Bfxz Cfb Plz Uqe*

Selecting cutting tools and machining methods for high strength and high temperature alloys

Anon. *Metalworking* 1959 pp 9-24 (Oct); *PERA Bull* 1960 Vol 13 (1) p 12 (Jan)

X *Bfxz Ceq Pd*

Tools at work—Stainless steel casting

Warner & Swasey Co, 5701 Carnegie Ave, Cleveland 3, Ohio. *Tool Engr* 1960 Vol 44 (1) p 104 (Jan)

A stainless steel casting for a turbine housing assembly is machined in four chuckings using carbide and HSS tools on a Warner & Swasey No 3 universal turret lathe. The part requires machining to within 0.001 in. on 4 in. diameters, with surface finish to 32 micro-in., r.m.s. and concentricity within 0.002 TIR. To ensure accuracy, the workpiece is held in a special face plate adapter during finishing. 1 illustr.

D *Am Bfdb Ceq Pdb/Am Bfdb Ceq Pdc*

New instrument provides direct monitoring of lathe tool position

Anon. *Machinery, NY* 1960 Vol 66 (6) pp 129-130 (Feb)

A new instrument, the Federal Distometer, is said to provide the lathe operator with a fast and reliable means of checking tool position and directly measuring longitudinal cutting distances, without the need for measuring rods, hand scales, or optical devices. The unit is attached to the rear of the lathe, travels with it continuously, and thus maintains a fixed relationship between the cutting tool and the instrument, also ensuring that both will have the same range of movement. 2 illustr.

D *Ceqb Pr Wp*

Setting multi-tool lathes in automatic lines to machine stepped shafts

I. G. Turchaninov, I. F. Neishtadt. *Machines & Tooling* 1959 Vol 30 (10) pp 12-14 (Oct) (Original in Russian)

4 illustr, 2 ref.

D *Ceqb Pr.133*

Automatic control in Czech milling machines. Die Automatisierung der Fraesmaschinen tschechoslowakischer Erzeugung

J. Strajbl. *Maschinenwelt u Elektrotechnik* 1960 Vol 15 (2) pp 55-57 (Feb) (In German)

7 illustr.

K *Wpz:Cff Pr.326*

Dividing heads

E. Botez. *Buchneuerscheinungen aus den volksdemokratischen Laendern* 1959 (26) p 35 (Original in Roumanian, abstr in German)

Book, Ed. tehnica.

Dividing heads of many kinds are dealt with and the author describes the operations for which they may be used, giving examples from the machining of gear wheels, milling cutters, *etc.*

[Not in library of Industrial Diamond Information Bureau].

K *AlCeq Pr Psx.52*

A comparative investigation of tooling conditions by cutting on the turning lathe with cutters equipped with ceramic and hard alloy tips

M. Popov, I. Mitrica, E. Dechu. *Rev de Mécan Appl* 1959 Vol 4 (1) pp 173-194; *Battelle Tech Rev—Abstr* 1959 Vol 8 (11) p 656a (Nov) (No 13232) (Original in Russian)

The optimum values of the geometric parameters of ceramic and hard alloy tips are approximately equal. Compared with hard alloy tips, the application range of ceramic tips is more narrow. The quality of the treated surface is better on cutting with ceramic tips.

X *Ceqb Pdc Pr/Ceqb Pdd Pr*

Chip production in the machining of metals. Die Spanbildung in der Metallbearbeitung

Anon. *Technik u Betr* 1960 Vol 12 (2) pp 24-26 (Feb) (In German)

8 illustr. *K* *Bf Ceq.21*

Accuracy and rigidity of chip producing machine tools. Genauigkeit und Steifigkeit spanender Werkzeugmaschinen

E. Saljé. *Werkst u Betr* 1960 Vol 93 (3) pp 129-137 (Mar) (In German)

33 illustr, 16 ref, 1 table. *K* *Ceqz Pr*

Hob cutters for gear wheels worked according to M. L. Nowikow

F. S. Dichtjar. *Vestn Masstro* 1959 Vol 39 (9) pp 8-13; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (11) p 916 (Nov) (In German, original in Russian)

Discusses hobbing processes and the profiling of cutting tools, including grinding wheels for machining gear wheels. *K* *Ad Ceg Pdz*

Formulae for calculating the cutting speed when machining austenite steel

G. A. Jakovenko. *Vestn Masstro* 1959 Vol 39 (9) p 66; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (11) p 922 (Nov) (In German, original in Russian)

Gives formulae derived from experiments and for use with cutting tools with sintered carbide inserts.
K *Bfdz Ceq Uqfb*

Faults in worm and gear cutting, their causes and results. Fehler bei Gewinden und Verzahnungen, ihre Uhrsachen und Folgen

F. Krueger. *Werkstattstechnik* 1960 Vol 50 (1) pp 17-19 (Jan) (In German)

2 ref. *K* *Ad Ceg.2591*

New lathe for long, thin, and profiled workpieces. Neuartige Drehbank fuer lange, duenne und profilierte Werkstuecke

Monarch Machine Tool Co, Sidney, Ohio. *Werkst u Betr* 1960 Vol 93 (3) p 151 (Mar) (In German)

This new kind of lathe is designed to overcome the difficulty of the springing back of long, thin workpieces on the application of the tool. Since with many workpieces two processes are necessary, roughing and planing, the machine can be fitted with two templates and with the corresponding tools at angle of 90° to each other. As the template swings, so the appropriate tool also swings into place. 1 illustr.
K *Az Ceqb Pr*

A new device for superfine adjustment

Komet Tool Holder & Tool Manufactory, Besigheim, Wuerttemberg, W Germany. *Microtecnic* 1959 Vol 13 (6) pp 305-306 (Dec) (In English)

For accurate turning lathe work, especially when precision turning and drilling by means of a carbide or diamond cutting edge, precise adjustment of the cutting edge to the required diameter is of paramount importance for the value of the diameter, the result of the work, and the possibility of quick adjustment crucially affecting the time required and thus work costs. The various factors to be considered when providing for the necessary adjustment are explained, and an adapted fine-adjustment tool is described in detail. 3 illustr, 2 ref.
D *Ceqb Pr:Nf Qz|Cepb Pr:Pd Qz*

The production of Veglia instruments for cars, Pt II

R. E. Green. *Machinery, Lond* 1960 Vol 96 (2467) pp 404-411 (Feb 24)

Machining the body for a fuel-level measuring instrument begins with drilling, reaming and counterboring on a 3-way installation employing standard units. In addition, two holes are deburred by an arrangement of drill guns fitted with right-angle heads. Other machining operations are described. 11 illustr.
D *Az Ceq*

Cutter knurls inside of stainless rings

F. J. Robotham & Co Ltd, 71 Lascelles Rd, Slough, Bucks. *Metalworking Prod* 1959 Vol 103 (51) p 2058 (Dec 18)

The problem of knurling thin-walled austentic stainless steel ring components has been solved by the use of a specially developed internal knurl cutter, adapted from Quick-Knit cutters. These differ from the conventional knurling tool since they mill the pattern, producing chips while doing so. The particular tool used in this case has a 9/16 in. diameter cutting wheel mounted at an angle on a special shank. The components vary between $\frac{3}{4}$ in. and $3\frac{7}{16}$ in. diameter in size. 2 illustr. *D* *Pdz*

Four fussy techniques build army's power reactor

Anon. *Amer Mach* 1960 Vol 104 (2) pp 119-121 (Jan 25)

Describes precision machining of the US army's first field-installed power reactor. High accuracy is vital because the unit is to be installed under water and repair of parts will be impossible. 4 illustr.
D *Az Ceq.342*

Machine for drilling cycle wheel hubs. Maschine zum Bohren von Farradnaben

Henschel-Werke GmbH, Kassel. *Werkst u Betr* 1960 Vol 93 (3) p 120 (Mar) (In German)

2 illustr. *K* *Az Cfb Pr*

Supplementary profiling attachment for mounting on existing lathes. Kopierzusatzeinheit zum Anbau an vorhandene Drehbaenke

Monarch Machine Tool Co, Sidney, Ohio. *Werkst u Betr* 1960 Vol 93 (3) p 120 (Mar) (In German)

This attachment, known as the Air Tracer Pak, is designed to enable existing lathes to be used for profiling work. Templates up to about 460 mm long can be reproduced and the maximum variation in diameter, with the copy slide at an angle of 45°, amounts to 127 millimetres. 1 illustr.
K *Ceqb Pr:Ceqg Psz*

Savings with 'throw-away' clamped-tip tools

A. W. Astrop. *Machinery, Lond* 1960 Vol 96 (2464) pp 232-236 (Feb 3)

Some examples of current practice at the Doncaster works of International Harvester Co of Great Britain Ltd. At present the Sandvik-Swedish Coromant T-Max range of clamped-tip throw-away type tungsten carbide tools are used. Each shape is made in 'utility' and 'precision' grades and for either negative or positive rake cutting. This firm finds the utility grade satisfactory and employs negative rake cutting, so that the tips can be inverted as well as indexed and every edge can thus be used. Applications of the tools are described. 5 illustr, 1 table. *D* *Pdcb*

Automatic methods play big role in Hydra-Matic torus fabrication

R. H. Spiotta. *Machinery, NY* 1960 Vol 66 (6) pp 103-110 (Feb)

Drilling operations are covered. 11 illustr.
D *Cfb*

Flexible production of V-6 and V-12 engine blocks

Anon. *Machinery, NY* 1960 Vol 66 (6) pp 115-120 (Feb)

Sintered carbide and HSS tools are used throughout the line. Carbides are employed for boring at speeds of 200 to 300 ft/min, and for reaming at 100 ft/minute. Drilling and tapping speeds with HSS vary between 40 and 70 ft/minute. 8 illustr.

D *Az Ceq Pdb/Az Ceq Pdc*

Helical-keyed drive-shaft is heart of torque sensing mechanism

S. Herman. *Machinery, NY* 1960 Vol 66 (6) pp 121-123 (Feb)

Operations on the spindle gear, drive pin holes, and drive-shafts are covered. 4 illustr.

D *Psl*

Universal workshop machine. Universal-Werkstaetten-Geraet

Hommelwerke GmbH, Mannheim-Kaefertal. *Werkstatttechnik* 1960 Vol 50 (2) pp 83-84 (Feb) (In German)

This machine is suitable for a wide range of workshops. It can be used for boring in all angular positions, for finish grinding and for horizontal and vertical milling. With the aid of special attachments, almost all chip producing processes can be carried out. 1 illustr.

K *Pr.263*

Crater wear of carbide cutting tools

T. Sata. *Trans Japan Soc mech Engrs* 1959 Vol 25 p 988; *Insdoc List* 1960 Vol 7 (1) col 33 (Jan 1)

D *Pdc Unr*

Power consumption in chip producing machining processes. Der Leistungsbedarf bei der spanenden Formung

H. Haidt. *Industrieblatt* 1960 Vol 60 (2) pp 87-94 (Feb) (In German)

Gives calculations for power consumption in turning, end milling, and plain milling. 13 illustr, 6 ref, 8 tables.

K *Ceqb.21/Cff.21*

Thread cutting on copy lathes. Gewindeschneiden auf Kopierdrehmaschinen

Haeuser. *Industrieblatt* 1960 Vol 60 (2) pp 96-97 (Feb) (In German)

The GSA 18 is the first screw cutting attachment which can carry out thread cutting during or immediately after the copy turning process. 6 illustr.

K *Ceqbz Pr:Ceqbd Psc*

'Building-Block' components that can be assembled to form precision deep-hole drilling machine

Drillmation Co Inc, Center Line, Mich. *Machinery, NY* 1960 Vol 66 (6) p 161 (Feb)

1 illustr *D* *Cfb Pr*

Buhr Economatic performs wide range of precision machining and non-machining operations

Buhr Machine Tool Co, Ann Arbor, Mich. *Machinery, NY* 1960 Vol 66 (6) pp 162-164 (Feb)

An Economatic transfer machine can perform 220 operations, among them drilling, reaming, surface generation and precision boring. 4 illustr.

D *Cz Prs*

Device for drilling two small holes close together

E. Jones. *Machinery, NY* 1960 Vol 66 (6) p 137 (Feb)

Describes a device, driven from a conventional drill chuck, which was designed to make possible the simultaneous drilling of two 5/64 in. holes close together. 1 illustr.

D *Cfb Psc*

Automation and the production of the Renault Dauphine

P. E. Bézier. *Machinery, Lond* 1960 Vol 96 (2464) pp 268-271 (Feb 3)

Special machine tools built by the company, principally from elements of standardized design, provide for drilling, tapping, milling and boring operations. This standardization has three aims: reduced initial cost, increased productivity, and reduction in stoppages. Results are illustrated. 2 illustr.

D *Az Ceq Pr.255*

Avey gun-drilling machine

Avey Div of Motch & Merryweather Machine Co, Cincinnati, Ohio. *Machinery, NY* 1960 Vol 66 (6) p 194 (Feb)

A gun-drilling machine incorporates three Avey No 2 BMA-5 top columns on a six-spindle lower column base and table. The spindles have an overhang of 12 in. and are spaced 24 in. between centres. They have power feed with fine-feed reducers and No 2 or No 3 Morse taper with holes drilled through the spindles for high pressure lubrication supply to single lip carbide gun drills. Speeds range up to 8,000 rev/minute. 1 illustr.

D *Cfbn Pr*

Vertical drilling machine

Universal Automatic Corp, Schiller Park, Ill. *Machinery, NY* 1960 Vol 66 (6) p 173 (Feb)

A single-spindle, vertical drilling machine with a full range of automatic controls handles the large variety of second-operation drilling, tapping, countersinking, facing, reaming, hollow milling, or threading operations on screw machine parts, die castings, stampings, headed or plastic parts. The capacity of this unit includes 0.020 to $\frac{3}{8}$ in. drilling in mild steel and up to $\frac{3}{8}$ in. tapping and $\frac{1}{2}$ in. threading.

D *Cfb Pr*

CUTTING AND MACHINING OF STONE, GLASS, ETC.

Automatic bevelling with 6-inch diamond wheels. Automatische Randbearbeitung mit Diamantscheiben

R. I. Youman. *Glas Digest* 1959 Vol 38 (5) pp 42-43, 90-92; abstr *Glastech Ber* 1960 Vol 33 (2) p 58 (Feb) (Original in English, abstr in German)

Reports on experiments made to investigate the automatic machining of the edges of glass mirrors with metal and synthetic bonded diamond wheels. Work is carried out on a special machine using four diamond wheels, progressively diminishing in grain size. The construction of the diamond wheels is explained and information given as to the most useful grain sizes and the best way of handling them.

K *Cegf Nv Prs*

The polishing of glass VI. Das Polieren von Glas VI

E. Brueche, K. Peter. *Glastech Ber* 1960 Vol 33 (2) pp 37-45 (Feb) (In German)

Various faults occur in the production of plate-glass for mirrors. These faults have been studied by light interference and electron microscopy and by Schlieren and Tolansky interference methods. Pits or deep craters in an otherwise well-polished surface are filled with a mass of polishing rouge and polishing detritus (gel), which can be removed with a diamond point or etched out with HF, thus exposing the crater. The article finishes by suggesting means by which these faults can be avoided. 16 illustr, 7 ref, 1 table.

K *Bmb Chm Unf*

The development of the dental drill

R. R. Stephens. *New Scientist* 1960 Vol 7 (170) pp 393-396 (Feb 18)

There has been continual effort to reduce vibration. By 1950, it was generally appreciated that vibration and pressure could be lessened or overcome if the peripheral speeds of rotation of the tools held in the handpiece could be increased sufficiently above the usual maximum of 10,000-15,000 rev/minute. The problem of frictional heat had been solved by spray cooling; diamond abrasive points, disks, and wheels were available as a better alternative to carborundum; and long-lasting tungsten carbide burrs were coming into general use. Both diamond and tungsten carbide would withstand high rotational speeds in contact with enamel and dentine. It remained to design an ultra-speed handpiece to spin burrs at 100,000-300,000 rev/minute. The development of miniature ball races suitable for this type of handpiece made possible the design of the ultra-speed air turbine tools now used, and these have opened a new era in cutting and grinding techniques. Burrs can operate in the handpieces without vibration or pressure detectable to the patient, although the great local heat developed is one of the special problems that must be solved. Handpieces giving a high torque speed range of 1,000-30,000 rev/min still have their particular applications and research is needed to replace noisy turbines by electric drives. It is pointed out that developments in dentistry may help in the grinding and polishing of such materials as ceramics, glass, vitreous enamels and the super-hard tool steels.

D *Nhf.132/Pld.132*

Hole-boring in glass. Das Bohren von Loechern in Glas I. Vida. *Rev Sci Instrum* 1959 Vol 30 (1) p 47; abstr *Glastech Ber* 1960 Vol 33 (2) p 58 (Feb) (Original in English, abstr in German)

K *Az Bm Cfd*

USP 2,906,256 (July 8, 1958) **T. W. Glynn, Blue Ridge Glass Corp**

Method and apparatus for drilling large holes through glass sheets

When drilling large holes with tubular drills, fairly high feed pressure is needed to overcome the coolant pressure inside the drill and thus a very rigid drill press is needed. This imposes a large bending moment on the glass sheet, which, together with vibration, frequently results in breakage. This pressure is unnecessary if the tube drill is placed against the glass sheet and then the air pressure inside the drill is reduced considerably. Coolant water is supplied outside the drill around its cutting edge. While 10 min were needed to drill a 6 in. hole with conventional methods, the new method enabled drilling of such a hole in 45 sec using a diamond tube drill. (6 claims, 1 illustr). Ref cited: 7 USP.

J *Az Bm Cfb Plz.545*

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 476 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 54s 6d, post free.

Swiss P 339,528 (Apr 20, 1956) **B. M. Phillips, E. H. Phillips, E. D. Phillips, W. Philips, J. B. Phillips**

Multifocal lens, method for its manufacture and machine for carrying out this method. Lentille multifocale, procédé pour sa fabrication et installation pour la mise en oeuvre de ce procédé

The lens has two zones which are separated by a shoulder. The shoulder projects beyond the zone for distant viewing and both zones have a common optical axis passing through the centre of the shoulder. Two operations or more are used to form two distinct zones with different curvature for distant and for near viewing, whereby the shoulder is given an inclination so as to project from the zone for distant viewing. Grinding is done by a series of grinding heads with diamond grinding rings or cup wheels over a table with angularly adjustable supports for the blanks to be ground arranged in a circle. First the upper zone is ground, then the lower zone. Next, triangular intermediate zones are ground which meet at the junction of both zones. The result is a homogeneous lens in one piece, multifocal and with a single axis, the shoulder eliminating any optical discontinuity. (21 claims, 33 illustr).

J *Bm Ceg Qc Tfb.545*

GEM POLISHING

Diamond microscope

E. G. Hoover Co. *Diamond News* 1960 Vol 23 (4) p 17 (Jan)

A binocular-type microscope, the Gemolite, is claimed to allow a thorough examination of the interior of a diamond, or other precious stone, for imperfections, and an inspection of the exterior for quality in cutting and finish.

D *F Hz Wcm*

The Bruce Bars

Anon. *Mineralogist* 1960 Vol 28 (2-3) pp 40, 42, 44 (Feb-Mar)

See *Industr Diam Abstr* 1960 Vol 17 p A43 (Feb).

D *Ag Cz Qv*

A word in favour of Antwerp

Anon. *Diamond News* 1960 Vol 23 (4) p 27 (Jan)

A reader points out that Antwerp employs between 12,000 and 15,000 diamond polishers, cleavers, *etc*, compared with Amsterdam's figure of under 1,000.

D *F.25.3235*

ROCK DRILLING

A laboratory study of two percussive-rotary drilling machines

G. A. Guppy. *Mine & Quarry Engng* 1960 Vol 26 (1) pp 22-29 (Jan)

Describes a comparative investigation of a Salzgitter V.100 and a Hausherr DK7ES percussive-rotary rock drilling machine at the Mining Research Establishment of the National Coal Board. 15 illustr, 5 ref.

D *Cfbf Pr.21/Cfbr Pr.21*

Abrasive wear effects in rotary rock drilling

B. G. Fish, G. A. Guppy, J. T. Rubens. *Bull Inst Min & Metall* 1960 (638) (Jan); *Trans* Vol 69 1959-60 Pt 4 pp 194-198

Authors' reply to discussion on paper published in May 1959 (*Trans* Vol 68 1958-59 pp 357-383).

The authors' experience is that, in rocks suitable for rotary drilling, carbide fracture is liable to occur at 100 rev/min, but is rare at 200 rev/min. At 300 rev/min there is negligible chance of fracture, but abrasive wear is proportionately higher. They conclude that 200 Kv/min is a reasonable compromise, and this figure is supported by other considerations than bit wear. The authors believe that carbide failures associated with low rotation speeds are due to sudden high peak torques rather than to high thrust. In their view, bit wear is by far the most important factor limiting the economic application of rotary drilling.

D *Bn Cfbr Pl Unr*

Improved diamond drilling

J. K. Hayes, V. Read. *Min Engng, NY* Vol 11 (1) p 49; abstr *Mine & Quarry Engng* 1960 Vol 26 (2) p 91 (Feb)

Increasing depths in diamond drilling have made it necessary to seek ways of improving drilling time and penetration rates, yet maintain high core recoveries. Wire line drilling was an important step, but much remains to be done. Work on oil drilling methods with NX conventional and BX wire line coring techniques, especially in badly fractured ground, has included the use of mud fluids for the control of coring and improvement of core recovery, quick setting gypsum cements for sealing zones of lost circulation, and the use of small explosive charges for backing-off stuck drilling tools. Results of work in these directions are described. *D* *Cfb Nh.21*

Drilling safeguard

Diamond Products Inc, Elyria, Ohio. *Rock Prod* 1959 Vol 62 (12) p 152 (Dec)

Described by the manufacturer as the 'greatest innovation in diamond drilling history', the No-Flo-No-Go device prevents a drill rig starting until water flows across the bit-face, and stops it automatically when the flow stops. It is said to be impossible to burn out expensive bits and in this way the device pays for itself during the first year of operation. No-Flo-No-Go is available on maker's drill rigs as standard equipment but can be factory-installed as an accessory on other rigs. *D* *Bn Cfb Nh.2595*

Sintered carbide tipped stone drills. Hartmetallbestueckte Mauerbohrer

Anon. *Industr Anzeig* 1960 Vol 82 (9) p 124 (Jan 29) (In German)

For the economical boring of concrete, stone, marble, porcelain, flagstones, tiles, glass, and all hard rocks, sintered carbide tipped drills are recommended. Only silicon carbide in a ceramic bond should be used for regrinding these tools.

K *Blb Cfb Pl Rh/Bm Cfb Pl Rh/Bn Cfb Pl Rh*

Rotary rock bit

Varel Mfg Co, 9230 Denton Dr, Dallas 20, Texas. *Rds & Str* 1959 Vol 102 (12) p 145 (Dec)

A new formation type rock bit, Varel V_3T, has been developed to meet the needs of blast hole drilling in quarrying operations where fast penetration rates are necessary, but where excessive gauge wear has been a problem. The bit maintains 'balanced design' in which each cone's tooth-cutter arrangement is balanced in relation to the other cones. This is said to ensure long bearing life and wear on all three cones, while giving optimum bottom hole cutting pattern for faster drilling.

D *Cfbr Pl*

Geology of Christopher Silver mine

J. Mason. *Canad Min J* 1959 Vol 80 (11) pp 71-77 (Nov)

The diamond drill is the most important single tool of exploration. In general, policy at the mine has been that any lateral or vertical development of over 50 ft must be preceded by a diamond drilling intersection containing visible silver, not necessarily ore grade, but negative drill results have to be studied closely also. 7 illustr, 3 ref. *D* *Cfb Nh:Bfbb.12*

Diamond drilling at Consolidated Normland

Anon. *Canad Min J* 1959 Vol 80 (10) p 147 (Oct)

The deepest hole drilled so far yielded 1.34 oz gold/ton for a core of 10 ft starting at 240 ft in the hole.

D *Bfba Cfb Nh.343*

New borehole survey instrument developed

Anon. *S Afr Min Engng J* 1960 Vol 71 Pt 1 (3497) p 765 (Feb 12)

A borehole survey instrument using electronic principles for continuously recording the direction and inclination of small diameter boreholes down to depths of 10,000 ft has been developed by Union Corporation.

D *Az Cfd V W*

Engineering and producing history of the Weyburn Field, Saskatchewan

Engineering & Production Staff (Central Del Rio Oils Ltd). *Canad Min metall J* 1959 Vol 52 (572) pp 762-770 (Dec)

All wells drilled have been evaluated by diamond cores. Normally cores from 50-60 ft in length and 3½ in. diameter are cut. 9 illustr, 1 table, 4 refs.

D *Az Cfb Nhe.12*

USP 2,903,242 (Sep 21, 1956) **A. G. Bodine jun**
Suspension system for sonic well drill or the like

In order to avoid serious loss of sonic energy, *ie* leakage of sonic waves up the drill string, the drill string is directly coupled to a velocity node, *ie* a region of high mechanical impedance, of the elastically vibratory system of the drill. Thus the drill string may be attached to the vibratory assembly at a quarter wavelength distance down from the upper end of the vibratory column. A vibration isolator is preferably provided in addition to the vibratory elastic column which may take the form of a heavy mass at a certain point. The drill may be composed of a centre leg and an outside tubular leg depending from a unitary head. Both legs are provided with hard cutting inserts. For an operating frequency of 120 cycles/sec, the leg length should be approximately 33 feet. The motions of the two leg structures are similar but at 180° phase difference. (18 claims, 15 illustr). Ref cited: 2 USP.

J *Az Cfbf Pl.545*

DAS 1,065,796 **F. Demetrescu, Comitetul Geologic de Cercetari si Explorare a Solului si Subsolului**
(Sep 13, 1955—conv date, Roumania)
Deep drilling method and device for carrying out the method. Tiefbohrverfahren mit Bohrkerngewinnung und Vorrichtung zur Durchfuehrung des Verfahrens

The core drill is provided with an interior ring above the circle of cutting bits which reduces the diameter of the aperture through which the core rises into the tubular drill body. An opening in the wall of the body above the ring and a valve at the top of the drill head cause a lateral deviation and a temporary cut-off of the drill fluid, which does not reach the bottom of the bore hole. The rising core does not disintegrate but is clamped in the tubular drill body by dry detritus which is not flushed away by fluid. (4 claims, 5 illustr). Ref cited: 1 USP; 2 books. *J* *Plb.545*

WIRE DRAWING

New machine for producing micro-wire. Neue Maschine zur Herstellung von Mikrodraehten

Anon. *Draht* 1960 Vol 11 (2) p 70 (Feb) (In German)

From a drop of metal weighing approximately 1.5 g this machine can produce a length of wire 3 km long, as fine as 2 μ in diameter. Silver, gold, tin, copper, cupro-nickel alloys and even cast iron can be used as raw materials. 2 illustr.

K *Anz Bf Cn Pr*

Wet wire drawing. Nassziehen

K. Becker. *Drahtwelt* 1960 Vol 46 (2) pp 93-96 (Feb) (In German)

Wet and dry wire drawing processes are compared and the relative advantages and disadvantages discussed.

K *An Cn.1456*

Diamond die control

E. C. Warwick. *Wire Ind* 1960 Vol 27 (314) pp 177-179 (Feb)

The author considers that friction plays a prime role as a wear mechanism in diamond dies and that the new anti-friction treatment described here should produce good results. General comments are made on diamond properties, relationship of die hole and crystal planes, and the effects of polishing a diamond. 1 illustr.

D *Nkb Unr*

A practical analysis of the causes of die wear in the dry drawing of ferrous wires

E. P. Riley-Gledhill. *Indian Wire Industr J* 1960 Vol 3 (1) pp 2-4 (Jan)

(To be cont). *D* *An Bfc Cn Pse Unr*

The manufacture of precision cold drawn shaped wire

J. Rigby. *Wire & Wire Prod* 1960 Vol 35 (1) pp 47, 49-53, 125 (Jan)

9 illustr. *D* *An Cnz Qc*

GRINDING AND POLISHING OF CARBIDES AND METALS

Grinding tools electrolytically

Matchless Machines Ltd, 18 Bolton St, London, W 1. *Mach Shop Mag* 1959 Vol 20 (11) pp 637-638 (Nov)

Makers claim that a wide range of materials can be electrolytically ground rapidly and with a fine finish. The recently developed Agathon method differs from metal plating in that the material removed from the work (anode) is not deposited onto the grinding disk (cathode); instead, it is carried away by the electrolyte without changing the character of the disk. So far carried out on conventional carbide tool grinding and lapping machines, the process is said to be superior to spark machining and grinding with diamond impregnated wheels, wear being less and output higher. Depending on the metal being cut, removal rates are between 0.012 and 0.061 cu. in./min, and makers estimate that three diamond wheel grinders could be replaced by one electrolytic machine. It is proposed to build normal diamond grinding and lapping machines which could be adapted to the new process if required. 1 illustr.

D *Al Chcr*

Sharpening milling cutters with backed-off teeth while retaining the original profile. L'affûtage des fraises à denture détalonnée à profil constant

Anon. *Machine-Outil Franç* 1960 Vol 25 (151) pp 79, 81 (Feb) (In French)

The article emphasizes the importance of frequent accurate sharpening to reduce wear on milling cutters to a minimum. The Profil machine can be fitted to most machines for sharpening milling cutters. It is designed to enable the cutter profile to be strictly maintained whatever the angle of rake, without the need for minute adjustment, since the only adjustment necessary is made during the actual machining of the grinding wheel. The diamond remains ready for use whenever necessary without any additional manipulation, and has only to be brought into position against the vertical axis of the grinding wheel. 3 illustr.

K *Alc Chch Pr*

The efficiency of centrifugal coolant supply in grinding. Efficacité de l'arrosage centrifuge dans la rectification

B. Puszet. *Machine-Outil Franç* 1960 Vol 25 (151) pp 113, 115, 117 (Feb) (In French)

Reports on recent experiments to determine the efficiency of centrifugal supply by which the coolant is forced through the pores of the grinding wheel itself. It was found that greater efficiency is achieved when the coolant is injected through the hub of the wheel, and that a combination of this method and exterior lubrication increases the life of the wheel in a proportion of 2 to 1, raises the wear coefficient by 45%, and reduces the power absorbed from 10 to 35% in cylindrical grinding, while the presence of lubricant in the pores of the grinding wheel does not upset its balance. 2 illustr, 2 tables.

K *Chc Pe Qs Sj*

Rolling and peening produces smooth finishes

D. Walker. *Tool Engr* 1960 Vol 44 (2) p 105 (Feb)

Roll-peening with bearingizing tools improves metallurgical properties while producing smooth finishes comparable with those obtained with grinding and honing in holes or on flat concentric surfaces. The article describes the process and typical applications and gives data to aid in hole surface preparation and sizing. 10 illustr, 1 table.

K *Cz PrUnf*

Non-backed-off hobbing cutters

Yu. V. TeVis, Z. M. Bugakov. *Machines & Tooling* 1959 Vol 30 (10) pp 31-33 (Oct) (Original in Russian)

The VNII segmental hobbing cutter differs from backed-off cutters in that cutters are ground on the peripheral faces and not on the cutting face of the teeth, which are ground separately as a set; grinding the peripheral face eliminates the need to safeguard the predetermined relationship between the peripheral and side clearance angles; and the peripheral and side clearance angles are established dependent on the cutting conditions, and not on the design and manufacturing requirements. These hobs have rational clearance angles which are said to ensure a longer tool life than backed-off cutters, and can be reground more often. The cutter is described. 5 illustr.

D *Cfq Pd*

The sharpening of end milling cutters with sintered carbide inserts. Nachschaerfarbeiten an hartmetallbestueckten Messerkoepfen

H. Haidt. *TZ prakt Metallbearb* 1960 Vol 54 (1) pp 16-19 (Jan) (In German)

10 illustr, 2 tables. *K* *Alc Bkc Chcz*

Honing drawn steel tubes. Honen gezogener Stahlrohre
G. Haasis. *Maschinenwelt u Elektrotechnik* 1960 Vol 15 (3) pp 91-93 (Feb) (In German)
When steel tubes are machined and fitted as hydraulic jacks onto machines and attachments, it is necessary for the interior of the tubes to undergo a further machining process. Advantages are claimed for the honing process as a machining method and suitable honing machines are described. 4 illustr, 1 table.
K *Ag Bfd Chh*

A solution to the problem of grinding the interior of pots by machine. Das maschinelle Innenschleifen von Toepfen wurde geloest
Gebr Hau Maschinenfabrik, Offenbach a.M. *Galvanotechnik* 1960 Vol 51 (1) pp 39, 41 (Jan 15) (In German)
4 illustr. *K* *Az Chcn Pr*

Right size wheels cut grinding costs
E. S. Avery. *Grinding & Finishing* 1960 Vol 6 (1) pp 52-55 (Jan)
11 illustr. *D* *Chc.252*

Vibrations cause grinding rejects
T. E. Douglas. *Tool Engr* 1960 Vol 44 (1) pp 109-110 (Jan)
Inferior surface finish, often attributed to an unbalanced grinding wheel, may be caused by machine vibration. Fast detection, analysis, and correction of vibration at its source is possible with electronic checking equipment. As a preventive maintenance tool, it can lengthen the life of capital equipment, it is claimed. 3 illustr. *D* *Chc Qn*

Effect of the relative displacement between the grinding wheel and the work on the wheel depth of cut in grinding operation
S. Shiozaki. *Trans Japan Soc mech Engrs* 1959 Vol 25 p 979; *Insdoc List* 1960 Vol 7 (1) col 33 (Jan 1)
D *Chc Pe.21*

Lapping valve seats in situ
Dewrance & Co Ltd, Great Dover St, London SE 1. *European Tech Dig* 1960 Vol 5 (2) pp 57-58 (Feb)
2 illustr. *X* *Az Chd*

Automation centerless grinding of ball pins
Anon. *Process Control & Automation* 1959 p 406 (Sep); *PERA Bull* 1960 Vol 13 (1) p 11 (Jan)
X *Az Chcc.133*

Centerless grinding faults and how to correct them
E. R. Larson. *Automatic Mach* 1959 pp 46-48 (Oct); *PERA Bull* 1960 Vol 13 (1) p 11 (Jan)
X *Chcc.2591*

Centreless circular lapping machine. Spitzenlose Rundlaeppmaschine
Hommelwerke GmbH, Mannheim-Kaefertal. *Drahtwelt* 1960 Vol 46 (1) p 36 (Jan) (In German)
1 illustr. *K* *Chd Pr*

Hard rock bits sharpened on the job
Anon. *Rds & Str* 1959 Vol 102 (12) p 85 (Dec)
Timken carbide insert rock bits, 2¼ in. sizes and smaller, were sharpened at a drilling site near Denver. Two grinders were used: one for large bits, the other for smaller bits. The 2¼ in. bits were sharpened on special carborundum grinding wheels. 1 illustr.
D *Alb Chc Pe Rgc*

How to sharpen ice skates
C. C. Porter. *Grits & Grinds* 1959 Vol 50 (12) pp 9-11 (Dec)
The three steps in sharpening ice-skates are: cross-grinding, parallel grinding and hand stoning. 4 illustr.
K *Az Chcz*

Far too much sintered carbide is still lost in grinding! Noch wird viel zu viel Hartmetall verschliffen!
Anon. *Technica* 1960 Vol 9 (5) pp 197-200 (Feb 26) (In German)
Correct grinding is essential in order to maintain cutting efficiency as well as to preserve tool life. The article emphasizes the importance of choosing the right tool for the job. Common errors are examined and helpful suggestions given, including an efficient way of cleaning diamond grinding wheels. 13 illustr.
K *Al Bkc Chc.1456/Cdb Nv.1456*

Machine for finishing small workpieces. Maschine xut Fertigung kurzer Werkstuecke
Anon. *Industriekurier* 1960 Vol 13 (32) p 118 (Mar 2) (In German)
1 illustr. *K* *Az Chm Pr*

Suction hood for abrasive belt-grinders. Staubhaube fuer Bandschleifmaschinen
Otto Keller, Jesingen-Teck, Germany. *Staub* 1960 Vol 20 (3) p 100 (Mar 1) (In German)
1 illustr. *K* *Chc Pee Pr Psz*

Slash costs with flat polishing
E. D. Hoskin. *Grinding & Finishing* 1960 Vol 6 (1) pp 43-45 (Jan)
Essentially a combination of metal removal or sizing and surface conditioning, abrasive flat polishing is said to be a versatile, cost-cutting way of roughing and finishing metal, suitable for medium and small-scale as well as large manufacturers. The flat polishing machine uses a coated abrasive belt as cutting tool and, by varying the abrasive, the machine can be adapted for different materials. *D* *Bf Chmz Pr.252*

Where polishing stands today
Anon. *Metalworking Prod* 1959 Vol 103 (51) pp 2053-2058 (Dec 18)
Includes sections on use of liquid polishing compounds, barrel finishing, spindle-type barreling machines, vibratory processes, and electrolytic polishing. 9 illustr. *D* *Chm.25:.132*

Polishing machine with exhaust fan and dust filter. Poliermaschine mit Exhaustor und Staubfilter
Anon. *Industr Anzeig* 1960 Vol 82 (18) pp 37-38 (Mar 1) (In German)
1 illustr.
K *Chm Pr Pwc/Chm Pr Pwz*

For a good mechanical finish
Anon. *Mod Metals* 1959 Vol 15 (8) p 48 (Sep); *Battelle Tech Rev—Abstr* 1960 Vol 9 (1) p 33a (Jan)
Describes processes and equipment for finishing aluminium, including grinding, polishing and barrel finishing.
D *Bfg Chm.1456/Bfg Chm.26*

[New series of finishing machines]
Anon. *Purchasing Week* 1960 Vol 3 (7) p 28 (Feb 15)
X *Chm Pr*

Fast grinding forms small torsion bars

B. C. Brosheer. *Metalworking Prod* 1960 Vol 104 (5) pp 207-209 (Feb 3)

Precision plunge grinding removes metal so fast at Ford's Indianapolis works that the operation requires exhaust hoods, coolant refrigeration, and high-flash-point grinding oil. 6 illustr.

D *Agz Chcd Pr*

The plane grinding of small workpieces in jigs. Das Flachschleifen von Kleinteilen in Spannvorrichtungen

J. Metternich. *Werkstattstechnik* 1960 Vol 50 (2) pp 81-82 (Feb) (In German)

Magnetic jigs for workpieces of various kinds are discussed. 6 illustr.

K *Az Chcm Pr Puz*

Peak achievements in Swiss machine tool manufacture. Spitzenleistungen des Schweizer Werkzeugmaschinenbaues

E. Mettler. *Industr Anzeig* 1960 Vol 82 (15-16) pp 218-221 (Feb 23) (In German, abstr in English and French)

The writer first determines what is meant by peak achievements in machine tool manufacture, then discusses in detail some of the more remarkable achievements. Among the machines described is a coordinate grinder with a capacity of 300 mm diameter and a conical grinding attachment for boreholes.

An external grinder for workpieces of up to 20 mm in diameter and 250 mm in length carries out three semi-automatic work cycles and the truing of the grinding wheel is automatic. The article also discusses a new machine for electrolytic tool grinding for which great advantages are claimed. 10 illustr.

K *Chc Pr.323*

Steadyrests, their use and misuse . . .

E. C. Enos. *Grits & Grinds* 1959 Vol 50 (11) pp 3-6 (Nov)

Correct use of steadyrests in cylindrical grinding of long, slender work helps prevent workpiece vibration and encourages perfectly straight, round grinding. Steadyresting should not be restricted to traverse grinding since there are countless plunge and shoulder grinding jobs where it proves useful. Advice on use is given. 5 illustr. *D* *Az Chcl Pr Psz*

Productive machining using end mills

G. G. Ovumyan. *Machines & Tooling* 1959 Vol 30 (10) pp 33-34 (Oct) (Original in Russian)

An end mill with a non-continuous profile, consisting of two straight lines, was developed for cutting large module gears. The peripheral edges of the cutter teeth can be re-ground on a universal tool grinder, using a cup wheel. Grinding on the peripheral faces ensures a constant peripheral clearance angle along the tooth length and increases the number of permissible regrinds for the same wear criterion. Design and grinding method are illustrated. 6 illustr.

D *Ad Ceg Pdz/Alz Chc*

Practical milling and gear cutting. Fraesen und Verzahnen in der Praxis

E. Widmer. *Technica* 1960 Vol 9 (6) pp 262-266 (Mar 11) (In German)

A general article which discusses various milling processes, emphasizes the need for frequent regrinding. The sharpening of milling cutters which have become too blunt results in higher costs and lower tool life. 19 illustr, 3 tables. (To be cont).

K *Ale Chc Uqe/Ale Chc.252*

Score : surface grinding—7 ; planing—4

R. L. McKee. *Grinding & Finishing* 1960 Vol 6 (1) p 13 (Jan)

High-powered precision surface grinding replaced planing and raised production from four to seven die blocks/shift, eliminating one change of set-up/die, when forging dies made of nickel-chrome-molybdenum steel were refinished. The machine was a 100 h.p. Mattison vertical spindle surface grinder, fitted with a special holding fixture so that the bevelled edges could be ground easily by tilting the die. 2 illustr.

D *Ax Bfdz Cem*Ax Bfdz Chcm*

Centerless grinding M-50 tool steel

Anon. *Grinding & Finishing* 1960 Vol 6 (1) pp 21-22 (Jan)

Reply to reader's question.

Recommendations are made on the centreless grinding of $\frac{1}{8}$ in. diameter rollers, $\frac{3}{4}$ in. diameter inner races, and 1 in. outer races. Because of the comparatively small diameter of the rolls, 80 grit semi-friable abrasive type, grade O, vitrified bond, is advised. For the inner and outer races, it might be necessary to use one or two grades softer. For finer finishes, a silicon carbide abrasive wheel in 320 grit size, grade N, shellac bond may be tried. *D* *Ag Bfdz Chcc*

Simplified methods for calculating the oscillating frequency of machine tool spindles. Vereinfachte Berechnung der Eigenschwingungsfrequenz von Spindeln an Werkzeugmaschinen

S. J. Zemljanuhin. *Industr Anzeig* 1960 Vol 82 (10) p 134 (Feb 2) (In German)

1 table. *K* *Pr Psl Qn*

Standard time data for grinding, Part II

E. A. Cyrol, R. L. Borck. *Grinding & Finishing* 1960 Vol 6 (1) pp 46-51 (Jan)

Covers the application of the data to surface grinding with a vertical spindle machine of the Blanchard type. 8 tables, 2 illustr. *D* *Chcm.213*

Grinding metals

Anon. *Buchneuerscheinungen aus den volksdemotratischen Laendern* 1959 (26) p 8 (Original in Czech, abstr in German)

[Not in library of the Industrial Diamond Information Bureau]. *K* *Bf Chc.52*

Tool sharpening is an art !

T. Hindson. *Carbide Engng* 1960 Vol 12 (1) pp 11-14 (Jan)

General observations and particular recommendations are made. Three examples of simple time-saving set-ups, and three variations of work rests are illustrated. A chart shows proper clearances on peripheral and side teeth of milling cutters. 7 illustr.

D *Al Chcz.21*

Questions from readers—Differences in soluble oils

Anon. *Grits & Grinds* 1959 Vol 50 (12) p 15 (Dec)

Reply to reader's question.

The writer lists the three main types of soluble oils : high lubricity, medium lubricity, medium detergency and high detergency. High detergency soluble oils, which are generally clear and thin feeling, are for use on very fine grit wheels and diamond wheels which cannot tolerate even the slighest 'gum loading' of the wheel face. The effect of these types of oil can be changed by increasing or decreasing its concentration in water. *K* *Skbb.21*

Automatic finishing machine handles tubular shapes

Acme Mfg Co, 1400 E Nine Mile Rd, Detroit 20, Mich. *Amer Mach* 1960 Vol 104 (3) p 162 (Feb 8)

Automatic polishing and buffing machine that finishes round, square, hexagonal or octagonal tubular metal parts, can also be used for automatic deburring operations on tubular-shaped parts or parts having holes that permit them to be chucked on a mandrel. Buffing wheels, abrasive belts, set-up wheels, or wire brushes can be applied on the machine to perform the desired type of operation. Parts up to 42 in. long can be handled. 1 illustr.

K *Ag Chm Prs*

New bandsaw blade is harder than a grinding wheel

Millers Falls Co, Greenfield, Mass. *Carbide Engng* 1960 Vol 12 (1) p 35 (Jan)

Jet Band, a bandsaw blade, is made from an entirely new alloy steel specially developed for this application. It contains a high proportion of vanadium carbide, which is harder than the aluminium oxide in grinding wheels and twice as hard as carbon bandsaw blades. Exceptional cutting power, ability to withstand abrasion, high fatigue resistance and flexibility comparable to carbon bands are also claimed.

D *Pe Unh*Pez Unh*

Grinding special rolls with crush-trued wheels

Anon. *Machinery, NY* 1960 Vol 66 (6) p 133 (Feb)

Rolls for many purposes can be ground to the required shape by either a single or repetitive application of a crush-trued wheel. Annular profiles that do not require undercutting or straight side walls, or those which do not extend too deeply into the periphery of a forming roll, are readily produced by this method. Similarly, longitudinal profiles can be ground in rolls. This may be done on a horizontal spindle surface grinder equipped with both a crush-truing device and a means for indexing the roll. 2 illustr.

D *Ag Chc Pr/Ab Cgj Pfc*

Air die grinder delivers up to 25,000 controllable RPM's

Superior Pneumatic & Mfg Inc, Cleveland, Ohio. *Grinding & Finishing* 1960 Vol 6 (1) pp 66-67 (Jan)

A new Model 1600 air die grinder is recommended for polishing, wire brushing and metal removal on dies, gear teeth, *etc.* The grinder takes standard rotary files, standard or carbide wheels, wire brushes, mounted wheels and sanding drums.

D *Ax Chc Pr*

Fixture for surface grinders

Products Supply Co, Ferndale, Mich. *Grinding & Finishing* 1960 Vol 6 (1) p 71 (Jan)

The Mini-Grind is a fixture to be used on surface grinders, with which it is possible to grind external diameters in any form and size ranging from 0.005 to 3½ in., it is claimed. No chucking or indicating is required to hold concentricity and size.

D *Chcm Pr Psc*

'Minigrind' miniature mounted wheels

T. Z. Richards. *Grits & Grinds* 1959 Vol 50 (12) pp 3-8 (Dec)

Carbide burrs and diamond impregnated laps and hones for internal grinding jobs on miniature ball bearings have now been largely superseded by miniature grinding wheels, such as the Norton Minigrind, of which this article gives details. The relatively fine grit specifications give faster cutting action when dressed with sharp, single-pointed diamonds, carefully selected, orientated and mounted. A point radius of 0.003 in. or less has been found to give optimum results. 5 illustr.

K *Abz Cg Nj/Pez*

Atrax 'Dia-Mo'-cut burrs

Atrax Co, Newington, Conn. *Machinery, NY* 1960 Vol 66 (6) pp 164-165 (Feb)

Dia-Mo-cut burrs are said to have all the advantages of the old diamond-cut burrs, plus longer tool life. It is claimed that the Dia-Mo-cut practically eliminates 'burr-climb', increases cutting action and stock removal, and reduces operator fatigue. The new cut design is especially adaptable for burring heat-treated, alloy, and stainless steels. 2 illustr.

D *Ceq Peb*

Twin-spindle automatic high speed grinding machine

Michigan Tool Co, Detroit, Mich. *Engrs Dig* 1960 Vol 21 (2) pp 121, 123 (Feb); *Machinery, NY* 1960 Vol 66 (6) p 176 (Feb)

A new twin-spindle automatic high speed grinder is designed for the simultaneous deburring and chamfering of the entire contour of both ends of the teeth on spur, helical, or bevel gears. The standard machine will handle gears from 3 to 13 in. o.d. but other models of the same type, suitable for gears up to 20 in. o.d. are also available. The machine utilizes reinforced air-driven grinding wheels operating at 17,000 rev/min, using shop air pressure regulated at the machine. Grinding wheel diameters range from 1¼ to 3 in. depending on gear size, and, to equalize wear on both sides of the wheels, they are interchanged on the spindles after every four hours. Air clamping is provided where necessary. 2 illustr.

D *Chc Pr*

Mattison No 24 and 36 rotary surface grinders

Gaston E Marbaix Ltd, Devonshire Hse, Vicarage Crescent, London SW 11. *Metalworking Prod* 1960 Vol 104 (8) pp 349-350 (Feb 24)

Air-operated quick-tilt device on Mattison vertical spindle rotary surface grinders swivels the wheelhead and spindle assembly on its slide a pre-determined amount to give wheel clearance for rough grinding, and returns it to the vertical flat grinding position for finishing. 1 illustr.

D *Chcm Pr*

Spiral points for drills

Cincinnati Lathe & Tool Co. British rep: Charles Churchill & Co, Birmingham. *New Scientist* 1960 Vol 7 (173) p 596 (Mar 10)

The Spiropoint mobile drill grinder forms spiral points on standard drills, thus reducing the drilling thrust required by an average of approximately 25%. 1 illustr.

W *Alb Chc Pr*

Japanese Hitachi bevel gear grinder

Hitachi Ltd, Tokyo. *Machinery, Lond* 1960 Vol 96 (2467) pp 430-432 (Feb 24)

A machine for grinding straight tooth and helical bevel gears, with crowning along the length of the tooth flanks, is designed to operate on a continuous indexing principle which is claimed to offer important advantages. 5 illustr.

D *Adz Chc Pr.373*

Heavy lathes and grinding machines from Poland.
Schwere Dreh- und Schleifmaschinen aus Polen

Anon. *Maschinenwelt u Elektrotechnik* 1960 Vol 15 (2) pp 62-63 (Feb) (In German)

The use of highly efficient sintered carbide tools for heavy workpieces has revolutionized machine construction and brought with it new problems. Certain machines are given special reference.

K *Ceqb Pr.329/Chc Pr.329*

Driving chuck for cylindrical grinding machines

V. A. Panteleev. *Machines & Tooling* 1959 Vol 30 (10) p 46 (Oct) (Original in Russian)

Clamping of the driving yoke is time-consuming and leaves the mark of the yoke screw on the component. These disadvantages are said to be largely eliminated by using the driving chucks described here. 1 illustr.

D *Chcl Pr Psh*

Bench grinding

Consolidated Pneumatic Tool Co Ltd, 232 Dawes Rd, London SW 6. *Metal Ind, Lond* 1960 Vol 96 (7) p 133 (Feb 12)

An air operated bench grinder, the 3190 M, has a 6 in. diameter wheel, 1 in. wide and a free operating speed of 4,500 rev/minute. The drilled base plate on which the grinder is mounted makes it particularly suitable for attaching to portable compressors for the maintenance of tools, but it will also find general application where occasional bench grinding is needed, and where a supply of compressed air is available. 1 illustr.

D *Chc Pr*

The Wild Heerbrug precision instrument factory

R. E. Green. *Machinery, Lond* 1960 Vol 96 (2466) pp 360-366 (Feb 17)

A section covers machining set-ups. Operations include grinding the bearing faces on nitrided steel bearing blocks for a theodolite telescope axis on a Magerle F.10 surface grinding machine. Surface height must be equal within 0.00008 inch. 13 illustr.

D *Bfdz Chcm*

Production lapping to high accuracy

Flexibox Ltd. *Metal Ind, Lond* 1960 Vol 96 (8) p 151 (Feb 19)

For lapping the surfaces of components to high standards of flatness and surface finish, the Flexibox Mark 15A lapping machine is suitable for bench mounting, so minimizing space requirements. Typical applications include deburring, surface finishing, and the lapping of virtually any article requiring a high degree of surface finish. 1 illustr.

D *Chd Pr*

Dowling bench tool-grinder

David Dowling Ltd, Church Rd, Harold Wood, Romford, Essex. *Metalworking Prod* 1960 Vol 104 (7) p 305 (Feb 17)

A bench tool and cutter grinder is characterized by a wheelhead which swings 180° in the vertical plane, enabling side and face cutters to be ground on the periphery and sides without altering the setting of the cutter. Between-centres capacity is 9 in. diameter by 13 in. and the wheel is adjustable between 2½ in. and 11 in. above the table. The universal workhead, movable in two planes, has a No 4 Morse taper for use when grinding end mills and facing mills. 1 illustr.

D *Al Chc Pr*

Automatic saw grinding

Wandsbeker Werkzeug Gesellschaft Beinhoff & Co, Koenigsreibe 14-16, Hamburg-Wandsbeck. *Mach Lloyd* 1960 Vol 32 (4A) p 50 (Feb 20)

Besides circular saws for both wood and metal, the Bucahdor machine is capable of dealing with a wide range of knives and blades as well as bandsaws and hacksaws. An interesting feature is that the grinding wheel contacts one face of the tooth on the in-feed, while the desired profile for the opposite tooth face is generated by the combined indexing of the tooth and withdrawal of the grinding wheel. In this way, it is claimed that between 50 and 80 teeth can be resharpened in a minute. 1 illustr.

D *Alz Chc Prs*

Internal grinding machine. Machine à rectifier les intérieurs

Anon. *Machine-Outil Franç* 1960 Vol 25 (152) p 93 (Mar) (In French)

The RM.12 M internal grinder, which will admit workpieces of up to 530 mm diameter and 800 mm length, with a maximum grinding length of 250 mm and a standard grinding spindle speed of 3,000 to 20,000 rev/min, is claimed to provide a rational solution to all internal grinding problems. The machine is equipped with numerous accessories, including an automatic diamond truing device. 1 illustr.

K *Chcn Pr*

Fully automatic machine for grinding crankshaft bearings and crankpins. Machine à rectifier les portées et les manetons de vilebrequin à cycle complètement automatique

Anon. *Machine-Outil Franç* 1960 Vol 25 (152) pp 95, 97 (Mar) (In French)

The machine exists in two versions: type 6008A which has a single grinding wheel, and type 6008B which is equipped with two wheels and can grind two bearings simultaneously. The diamond truing operation is completely automatic. 4 illustr.

K *Ay Chc Pr:Nj Psf*

Spot news

Anon. *Metalworking Prod* 1959 Vol 103 (51) p 5 (Dec 18)

A wet belt-type centreless grinding and polishing machine uses a 6 in. wide belt operating at three speeds up to 5,000 ft/min, with 5 in. diameter rubber-faced contact wheel. Stock removal rates up to 0.010 in./pass are possible; for polishing, mirror finishes are said to be attainable at feed rates of 25 ft/minute.

D *Chcc Peez Pr/Chm Peez Pr*

Surface grinder for form grinding, other toolroom uses

Micromatic Hone Corp, Detroit, Mich. *Grinding & Finishing* 1960 Vol 6 (1) p 63 (Jan)

Micromatic's new Model 1400 surface grinder is said to have all the best features of their smaller and established Model 540, but is of larger capacity and includes additional features. Model 1400 is most suitable for form grinding and other toolroom uses. 1 illustr.

D *Chcm Pr:Chcb*

Monobloc lapping machines. Machine à lapider Monobloc

Anon. *Eurotec* 1960 (5) p 8 (Feb) (In French, abstrs in English, German and Italian)

Two types of Monobloc lapping machines are produced, having either two or three wheels. The wheel diameter is 7½ in. and the speed is 1,800 rev/minute. They are fitted with special bearings for all rotating parts. 1 illustr.

K *Chd Pr*

Landis 'Size-Finder' with microfeed for grinding multiple diameter work

Landis Tool Co, Waynesboro, Pa. *Machinery, NY* 1960 Vol 66 (6) p 172 (Feb)

The Landis Size-Finder is said to make substantial savings in set-up and operating time when precision grinding shafts with two or more diameters of different sizes. The equipment is specially adapted for grinding small to medium size lots of multiple diameter shafts for machine tools, electric motors, *etc.* A higher degree of accuracy in the concentricity between diameters is also said to be obtained than when workpieces are racked or re-chucked between operations. The principles of operation are explained. 2 illustr.

D *Chc Pr*

Bit sharpener

Gardner-Denver Co, Quincy, Ill. *Engng & Min J* 1960 Vol 161 (1) p 45 (Jan); *Rock Prod* 1959 Vol 62 (11) p 164 (Nov)

A self-contained unit is designed for sharpening large drill bits with controlled grinding wheel movement to finish all surfaces accurately. The G6 bit grinder is designed to sharpen the larger bits with G-D 600, 700 and 1000 series thread and the Mole-Drill bits, but it will also take Timken A, D, and K sizes. Either cross or chisel face types can be ground. 1 illustr.

D *Alb Chcz Pr*

Con-rod grinder has automatic size control

Anon. *Metalworking Prod* 1960 Vol 104 (5) pp 204-205 (Feb 3)

When fitted with a special workholding fixture, the Newall-Keighley AK automatic internal grinder completely grinds con-rod-big-end bores 1.515 in. long to a finished size of $2.394 + 0.0005 - 0.0000$ diameter in a floor-to-floor time of 54 seconds. 4 illustr.

D *Agz Chc Pr*

A twist drill grinding machine

A. Tatar, Stuttgart. *Metalworking Prod* 1960 Vol 104 (6) p 5 (Feb 10)

A twist drill grinding machine with built-in optical inspection unit has a capacity for 1/64-25/64 in. drills. The drill is held in a swivel arm which swings between grinding and inspection positions so that, after insertion into its collet and a quick visual check for concentricity and edge condition, simple manipulation of the arm correctly positions the drill point before the grinding wheel. Cross hair lines on the amplified viewing screen provide necessary reference points.

D *Alb Chc Pr*

Machine for grinding tumbling mills. Appareil à rectifier les fraises-tour-teaux

Diamant Nickel. *Mach Mod* 1960 Vol 54 (611) p 12 (Feb) (In French)

1 illustr. *K* *Az Chc Pr*

Vauxhall plan for . . . flow production of valves

D. J. Fishlock. *Metalworking Prod* 1960 Vol 104 (6) pp 241-248 (Feb 10)

Valve stems are semi-finished on a Cincinnati centreless grinder to an accuracy of 0.001 in., before they pass to the Lapmaster for squaring to within 0.001 in. total indicator reading. Final grinding of the stem to an 8-16 micro-in. finish and an accuracy of 0.00025 in. is on a Cincinnati No 2LO centreless grinder. Two Landis Model H grinders perform the last machining operation on the seat, which must be ground smooth, free from chatter, concentric with the stem, and conical within 0.002 in. total indicator reading. 15 illustr.

D *Chcc Pr:Az Qc*

DAS 1,061,222 **E. F. Render, Cincinnati Milling Machine Co**

Device for centreless grinding of workpieces. Vorrichtung zum spitzenlosen Schleifen von Werkstuecken

When using a centreless grinder to grind workpieces of diameter larger than their length, such as ball bearing races, piston rings, *etc*, the workpieces in front tend to pass the grinding station at greater speed than those following so that gaps develop. The workpieces lose their lateral support and frequently adopt an oblique position resulting in inaccurate dimensioning.

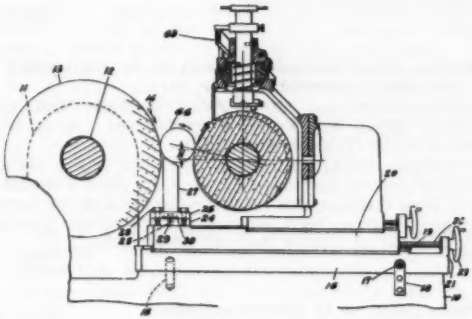
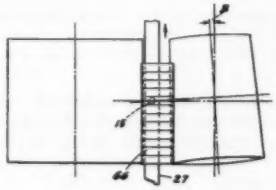


Fig 21 (above) and 22. Arrangement of conical control wheel at a certain angle to the grinding wheel. DAS 1,061,222.



This can be avoided by arranging a conical control wheel at a certain angle to the grinding wheel as shown in Fig 21 and 22. Angle B of $\frac{1}{4}°$ causes the feed to decrease from 95.839 cm/min to 94.882 cm/min, equal to 1% for a control wheel of a radius of 17.145 cm at the entry side and a radius of 17.069 cm at the discharge side. 63 is the adjustable guide rail for truing the control wheel. (2 claims, 3 illustr). Ref cited: 1 GP; 5 USP. *J* *Ag Chcc Pr.545*

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C 98—The resistance of diamond to abrasion, by E. M. Wilks and J. Wilks (*Phil Mag* 1959).

I 252—A new method of determining the average shape of diamond and other particles, by J. F. H. Custers and F. A. Raal; A counting device for diamonds, by F. A. Raal, (*IDR* 1959).

I 253—Factors affecting the efficiency of resinoid-bonded diamond wheels, by R. G. Weavind (*IDR* 1959).

MACHINING DEVELOPMENTS

Machining with electron beams

Anon. *New Scientist* 1960 Vol 7 (170) p 399 (Feb 18)

K. H. Steigerwald, of the West German Zeiss works, has devised a machine which uses an electron beam for cutting, welding and boring metals and alloys. The equipment is thought to be particularly suitable for working metals with a high melting point, *eg* titanium, zirconium, and hard materials, *eg* steel and tungsten. The operation takes place in a vacuum. A beam of electrons, accelerated to high energies, is focused on the workpiece by magnetic means. At the spot where it hits the object the metal will evaporate so that slits and holes can be formed.

D *Bf Ceqh*

Electron beam machining process to be represented by Hamilton-Standard

Hamilton-Electrona Inc, 40 Wall St, New York City. *Carbide Engng* 1960 Vol 12 (1) p 34 (Jan); *Amer Mach* 1960 Vol 104 (2) p 101 (Jan 25)

Exclusive North American rights to a new electron beam process developed by the Carl Zeiss Foundation of West Germany for machining or welding the hardest materials have been acquired by Hamilton Standard, a division of United Aircraft Corporation.

D *Cqgz.322*

What's going on in electromachining

Anon. *Steel* 1959 Vol 145 pp 80-83 (Aug 24); *Battelle Tech Rev—Abstr* 1959 Vol 8 (11) p 656a (Nov) (No 13233)

Progress report on spark machining, in which a shower of electrical sparks is used to blast off metal particles, and electrolytic machining, in which the metal is electrolytically deplated from the work.

X *Ceqm.21*

New concepts in the field of automatic thread cutting. Nuovi concetti nel campo della filettatura automatica

R. Mannaioni. *Macchine* 1960 Vol 15 (1) pp 19-23 (Jan) (In Italian)

1 illustr, 1 table. *M* *Ceqbd Prs*

Regarding the problem of the volume of molten metal during electrical erosion

A. S. Zingerman. *Sov Phys, Solid State* 1959 Vol 1 (2) pp 255-260 (Feb) (Original in Russian)

31 ref. *D* *Ceqn.21*

The relation between surface quality and the parameters of particular depressions in electro-erosive machining

B. N. Zolotych. *Vestn Masstro* 1959 Vol 39 (10) pp 58-61; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (11) pp 927-928 (Nov) (In German, original in Russian)

K *Ceqn Unf*

Kinematics of the dimensional ultrasonic machining method

A. I. Markov. *Machines & Tooling* 1959 Vol 30 (10) pp 28-31 (Oct) (Original in Russian)

4 illustr, 10 ref. *D* *Cegr Unz*

LITERATURE REQUESTS
Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

Electro-erosive broaching applied to the production of sintered carbide matrices

A. N. Kamorkin. *Vestn Masstro* 1959 Vol 39 (11) p 63-68; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (12) p 1022 (Dec) (In German, original in Russian)

K *Az Bkc Cfmz*

Erodomatic bench type electro-eroder

Wickman Ltd, Upper York St, Coventry. *Metalworking Prod* 1960 Vol 104 (7) pp 305-306 (Feb 17)

Bench-type Erodomatic electro erosion machine, rated at 1.5 kVA, with a worktable measuring 8 in. by 5 in., has been introduced for direct connection to single phase mains. This machine will produce holes or impressions up to the full depth of the work tank, which contains 6 in. maximum depth of dielectric. Maximum stroke of the quill is 8 in. in two 4 in. stages.

1 illustr. *D* *Ceqn Pr*

Analysis of the self-adjusting process in electro-erosive cutting

E. I. Slepuskin. *Izv Akad nauk SSSR Otd techn nauk Energet i Avtomat* 1959 Vol 4 pp 138-147; *Inhaltsverzeichnisse sowjet Fachzeits* 1959 Vol 8 (12) p 1038 (Dec) (In German, original in Russian)

K *Ceqm.21*

5th International Conference on Electro-plating and Surface Machining at Detroit (Mich) USA. 5. Internationale Tagung fuer Galvanotechnik und Oberflaechenbehandlung in Detroit (Mich) USA

Anon. *Industrieblatt* 1960 Vol 60 (1) pp 20-24 (Jan 25) (In German)

K *Ceqz.231.31/Chpb.231.31*

Ultrasonic cleaning of self-registering revolution counters reduces maintenance costs. Le nettoyage ultrasonique réduit les frais d'entretien des compteurs-enregistreurs

Anon. *Mach Mod* 1960 Vol 54 (611) pp 25-28 (Feb) (In French)

2 illustr. *K* *Cdbz Wpz*

USP 2,902,585 **J. L. Adcock, Wickman Ltd** (Dec 5, 1956—conv date, Gt Britain)

Electro-erosion of metals

For forming holes of 0.065 in. diameter and less in metal a straight tubular electrode, which may be rotated, is employed. A non-pulsating stream of clean dielectric (kerosene) is forced through the electrode under a pressure of 80 psi. The kerosene is discharged through the annular space between electrode and hole. The electrode passes a guide at about 0.06 in. from the face of the workpiece. A longitudinal vibratory movement may be imparted periodically to electrode or workpiece to enlarge the spark gap and thus minimize the risk of arcing. A straight hole 3.5 in. long can be produced in hard metal. (5 claims). Ref cited : 1 USP; 1 BP.

J *Bf Ceqn Ptc.545*

USP 2,902,586 (Apr 9, 1958) **V. E. Matulaitis, Elox Corp**

EDM (disc cutter)

This is an electrical discharge machine for cutting hard metals, *eg* carbides, which are difficult to cut with ordinary diamond wheels. The machine uses a rotating disk electrode of 0.005 in. thickness with spring pressed friction shoes of tungsten carbide on both sides of the electrode to maintain rigidity against wobble during rotation. The electrode is mounted on a cutting head automatically fed towards the workpiece, the rate of feed being adjusted according to material and desired finish. (10 claims, 4 illustr). Ref cited : 2 USP.

J *Ceqm Ptc.545*

USP 2,903,555 (Mar 11, 1957) **C. P. Porterfield, Firth Sterling Inc**

Electrode position for spark machining apparatus

The spark gap is maintained at its optimum by making use of a signal derived from the spark gap voltage, which provides a motor control voltage for correspondingly varying the operating speed. A voltage integrating network signal is amplified by a magnetic amplifier to raise it to an adequate power level for controlling the feed motor. The sensing of a short circuit condition results in the immediate application of full voltage to the feed motor for maximum speed separation of the electrodes so as to avoid damage to the workpiece due to high thermal gradients. (13 claims, 4 illustr). Ref cited : 3 USP ; 2 FP ; 1 BP. *J* *Ceqm Ptc.545*

USP 2,903,556 (May 17, 1955) **I. C. McKechnie, Elox Corp**

High frequency vibration

Under certain conditions "stringers" of eroded material tend to bridge the gap when machining by spark erosion and to form a short circuit which interrupts the work and may impair the surface finish by heating. It has been found that vibration of the electrode at very high frequency, *ie* above 15,000 cycles, and very low amplitude, approximately 0.000001 in., will break the stringers instantly or prevent them from forming, without affecting the dimensional accuracy. (7 claims, 2 illustr). Ref cited : 3 USP ; see also USP 2,501,954 (automatic feed).
J *Ptc Qn.545*

USP 2,903,557 (Dec 26, 1957) **V. E. Matulaitis, Elox Corp**

Arc machining with band electrode

Sawing hard material, such as tungsten carbide, by spark machining with a wire electrode has hitherto failed in practice because of excessive electrode wear. The problem has been solved by controlling the speed of the wire traversing the workpiece in accordance with the current through the gap. The wire is passed over a reel driven by a motor whose speed is proportional to the average current through the gap. This is achieved by interposition of a network between power supply and electrode, consisting of a resistor and a condenser. The armature of the motor is connected across the resistor-condenser network which functions as a current measuring shunt, the voltage across the network being directly proportional to the gap current. (8 claims, 1 illustr). Ref cited : 2 USP ; 1 BP ; see also USP 2,526,423. *J* *Ceqm Ptc.545*

PRODUCTION, GRADING & RECOVERY OF ABRASIVE PARTICLES

New Bear-Tex polishing wheel produces unique finishes

Behr-Manning Div, Norton Co. *Grits & Grinds* 1959 Vol 50 (11) pp 14-15 (Nov)

A new form of abrasive tool consists of wheels and rolls of non-woven nylon fibre with abrasive grain dispersed throughout. So far mainly silicon carbide abrasive has been tested and good results in finishing and polishing in the metal, plastics, rubber and wood-working industries are expected. 2 illustr.
D *Bf Chm Pr Unf/Bp Chm Pe Unf/ Bq Chm Pe Unf/Bz Chm Pe Unf*

Methods of grain size determination

F. Schueckher, L. Janerot. *Jernkontor Ann* 1959 Vol 143 (9) pp 593-614 ; *BNF Bull* 1960 Vol 40 (368) p 118 (Mar) (Original in Swedish)

Comparative examination of various methods, with results obtained with Cu, Al, brass and steel specimens. Methods commonly used for production purposes in Sweden are those of ASTM and Jernkontorets ; results are interconvertible.
K *Bfy Cz Uu.1456*

Ore dressing notes

Anon. *Min Mag, Lond* 1960 Vol 102 (1) pp 28-30 (Jan)

Under a section on dielectrics, the movement of particles is discussed. Work by H. A. Pohl at Princetown has led to the making of a miniature electric pump, which works on one-millionth of a watt. The principles of operation are explained. Separation is due to differences in dielectric constant, which varies considerably from that of quartz sand (3.8) to diamond (5.5), *etc.* The isomotive cell, as the pump is called, has been used successfully to separate abraded diamond waste from diamond wheel cuttings. Other applications are described. *D* *Hwd/Vgh*

The use of a new precision micro-sieve for grain-size analysis. Anwendung neuartiger Praezisions-Mikro-siebe fuer Korngroessenbestimmungen

O. Lauer. *Staub* 1960 Vol 20 (3) pp 69-71 (Mar 1) (In German)

A new method for manufacturing analytical sieves with mesh widths down to 20 μ has been developed in the US. Sieving can be carried out with a much higher degree of accuracy than with conventional test-sieves, and in conjunction with the well-known Alpine-made Air Jet Sieve, these sieves have proved efficient on an industrial scale. A large variety of substances have already been successfully tested with this apparatus. 9 illustr, 2 ref. *K* *Vgh*

Sorting fine-grained dielectrical powder according to grain size in electric fields. Sortierung feinkoerniger dielektrischer Pulver nach der Korngroesse in elektrischen Feldern

G. Albrecht. *Technik* 1959 Vol 14 (8) pp 532-533 ; *Staub* 1960 Vol 20 (3) p 84 (Mar 1) (In German)
K *Vgh*

Dust measurement

M. I. Henderson. *New Scientist* 1960 Vol 7 (174) p 678 (Mar 17)

Letter to the editor.

A non-optical method of dust sizing giving direct measurement of particle volume in the range ½ to 200 microns. By this 'Coulter Principle', which is described, the number of particles above a given size in a sample can be counted at the rate of 10,000/second.

See also *Instrum Rev* 1960 Vol 7 (93) p 407 (Mar 14).
W *Ty V W*

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 54s 6d, post free.

TOOL PRODUCTION

Methods of increasing the working speeds of automatic equipment

G. M. Rivkin, M. A. Esterzon. *Machines & Tooling* 1959 Vol 30 (10) pp 2-6 (Oct) (Original in Russian)

The intensity of the working conditions of metal cutting equipment can be improved in three ways : (i) cutting properties can be increased by attention to tool materials and geometry of the cutting edges ; (ii) development of designs to ensure systematic re-grinding and substitution of cutting edges ; (iii) reduction or elimination of operating time losses due to tool adjustments or changes. The methods are discussed giving examples of particular operations. 11 illustr, 8 ref. *D* *Bf Ceg Prs*

Step-feed system for deep-hole drilling

Associated Electrical Industries (Rugby) Ltd. *Machinery, Lond* 1960 Vol 96 (2466) pp 369-370 (Feb 17) ; *Metal-working Prod* 1960 Vol 104 (5) pp 194-195 (Feb 3)

An all-electric system was developed for incorporation in a Kitchen & Wade unit drilling head. The process is outlined. 2 illustr. *D* *Az Cfb Prd*

Influence of nickel on HSS for tools. Influenza del nickel sugli acciai rapidi per utensili

Anon. *Macchine* 1960 Vol 15 (1) p 67 (Jan) (In Italian) *M* *Pdb*

Machines and tools used in cold rolling, with special reference to modern techniques (Part II : Tools). Maschinen und Werkzeuge fuer die Kaltstauchung unter Beruecksichtigung moderner Erkenntnisse (Teil II : Werkzeuge)

F. O. Rabenhorst. *Drahtwelt* 1960 Vol 46 (1) pp 23-26 (Jan) (In German)

The article contains a general discussion of the tools used in this process. Tools with sintered carbide inserts are now being used because of their greater durability. Frequent cleaning is necessary for sintered carbide tools, and for this purpose diamond pastes of grain sizes 4 or 1 to 2 micron should be used. 5 illustr. *K* *Al Bkc Cdb Kmg*

Lap for reconditioning carbide reamers

H. J. Gerber. *Grinding & Finishing* 1960 Vol 6 (1) p 29 (Jan)

A bronze bushing, bored to correct size and split diagonally, is said to make a good lap for removing roughness from the peripheral edges of the flutes of a carbide reamer. The reamer is mounted in a lathe, the lathe spindle is revolved in reverse, and the lap moved back and forth along the reamer's flutes. The cutting medium is a diamond compound. *D* *Ald Bkc Chd Pg*

Ceramics as cutting tools—production, properties and applications. Schneidkeramik. Herstellung, Eigenschaften und Anwendung

C. Agte, R. Kohlermann, E. Heymel. *Werkst u Betr* 1960 Vol 93 (3) p 165 (Mar) (In German)

Book, Akademie Verlag, Berlin. 1959, 303 pp, illustr. Price DM 19.50.

Surveys the most important physical and technical properties of ceramic cutting tools, describes the way they are produced, and compares them with other tool materials, such as sintered carbides, for economical work. In some cases they are clearly more economical than sintered carbides, it is said.

[Not in library of Industrial Diamond Information Bureau]. *K* *Pd.21.52*

Evolution of a tool holder [:] objectives and results

W. Bader. *Carbide Engng* 1960 Vol 12 (1) pp 16-20 (Jan)

Eighteen prototypes led to the development of an entirely new design of toolholder for throw-away inserts. 10 illustr. *D* *Psp.21*

'Bubble' wheels for soft non-metallics

D. G. Foot (Carborundum Co). *Grinding & Finishing* 1960 Vol 6 (1) pp 30-31 (Jan)

A new abrasive wheel, using alumina bubbles with resinoid bond, is claimed to be easily formed to operate at 9,500 sfpm, and to grind rubber, plastics, *etc*, efficiently and without loading. An abrasive stick or diamond can be used to shape these wheels to almost any contour, it is said. 2 illustr.
D *Ab Cg Nv/Bz Chc Pe Rj Urb*

Diamond bit development near Sydney

L. M. Bailey. *Diamond News* 1960 Vol 23 (4) p 13 (Jan)

A combined bit and reamer, developed at Warragamba Dam near Sydney, is said to be unique in diamond drilling practice. The difficulties that led to the design are described. Further development is not economically possible until a matrix for diamond setting is introduced which is far more abrasion resistant than those in use, and until a readily worked material as hard as stainless steel becomes available for the manufacture of blanks.
D *Nhb.132.33*

How they teach machining of polygon-shaped holes

W. Walker. *Carbide Engng* 1960 Vol 12 (1) pp 22-23, 26-27 (Jan)

Designing and making special tools for machining polygon-shaped holes are described. The work can be done on drilling and milling machines and on ram or turret lathes. Equipment needed consists of a special drill, a drill holder and usually a template or guide plate. 10 illustr. *D* *Az Beq Pr*

Pink quartz of cubical shape for barrel finishing

Techline Div, Wheelabrator Corp, 1147 Avenue V, Vicksburg, Mich. *Machinery, NY* 1960 Vol 66 (6) p 146 (Feb)

The material is processed into shapes predominantly cubical. This shape tends to reduce the problem of lodgement when intricately shaped parts are being finished. *D* *Bcbz Chmz*

Vitrified abrasive wheels : III (I), Melting and softening state of bonds

Y. Ito, S. Kato. *Nagoya Kogyo Gijutsu Shikensho Hokoku* 1953 Vol 2 (11) pp 23-31 ; *Ceram Abstr* 1960 Vol 43 (2) p 27 (Feb)

Bonds composed of thirteen feldspars and seven basic compositions were prepared. Shrinkage during heating and the progress of vitrification were continuously observed. *D* *Pe Ue*

BP 821,596 **VEB Hartmetallwerk Immelborn**
(Sep 7, 1957—conv date, Germany)

Highly wear-resistant material comprising alumina and heavy metal carbides and process for the production thereof

Ceramic cutting materials have the advantage not only of great hardness, wear-resistance, and superior hot-bending strength, but also of low thermal conductivity favouring plastic deformation of the cuttings, and of little or no erosion because there is hardly any welding and diffusion between the chips ; finally, there is no harmful oxidation. On the other hand, the toughness of known ceramic cutting materials is very low in

comparison with hard metal. Low thermal conductivity can be unfavourable in grinding operations leading to stress cracks. High sintering temperatures and the need for the presence of an oxidizing atmosphere create manufacturing difficulties and high production costs. Therefore it has been the practice to add up to 40% metal to obtain "cermets" and recently up to 70% heavy metal carbides have been added. Now it has been found that instead of pure heavy metal carbides, mixed crystals of two or more heavy metal carbides should be used, especially carbides of tungsten and molybdenum. With such cutting tools it has been possible to use cutting speeds never before possible. (6 claims).

J *Pdc Ungd.545/Pdd Ungd.545*

USP 2,902,259 (Nov 27, 1956) **C. W. Tilden**

Percussion drill bit and method of producing it

The drill bit is characterized by longitudinally arranged chip discharge grooves and a central chip discharge bore with an aperture leading rearwardly into one of the grooves. The radial tungsten carbide cutting teeth are mounted in slots between the grooves; the exposed outer edges are finish ground as shown in Figs 23 and 24 using a wheel 38 with a rounded periphery

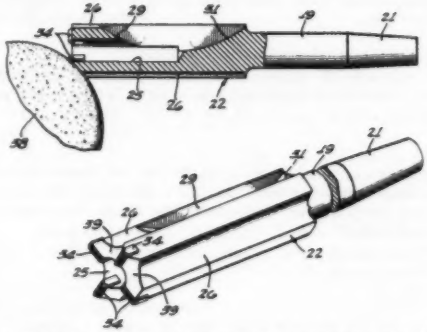

Fig 23 (above). The last stage in producing the bit.
Fig 24. The finished drill bit. USP 2,902,259.

to form inclined channels 39 at the ends of grooves 26, one of which is connected with the central bore 25 through milled slot 29. Grooves and bore offer minimum resistance to the removal of the debris and furthermore prevent any packing action during reciprocation of the bit. (8 claims, 11 illustr). Ref cited: 9 USP; 1 DBP.

J *Cfbf Pl.545*

USP 2,903,240 (Nov 1, 1957) **A. A. Mathewson, C. S. Panfield, Borg-Warner Corp**

Sonic earth boring drill

When a drill of the vibratory type is used for some period of time the bit becomes somewhat dulled and the bore is thus smaller than in a new and unworn drill. When it becomes necessary to change bits, the bore has to be reamed, before inserting the new bit, to prevent it becoming stuck. The remedy is to have the centre-line of the bit at the end of the bar misaligned slightly to the centreline of the bar. In this way, lateral vibrations of the bit are induced so that the bore in the formation is of greater diameter than the diameter of the bit. It has been found that when a 10¾ in. bit is resonated longitudinally at 100 cycles/sec, an eccentricity of 1/16 in. to ¼ in. seems to be quite effective. (8 claims, 5 illustr). Ref cited: 4 USP.

J *Bz Cfb Plz.545*

USP 2,904,418 (Feb 25, 1955) **F. Fahnoe, Vibro Corp of America**

Method of making a grinding tool

The tool is intended for high speed grinding or lapping of quartz glass, sintered carbides, and ceramics (steatite). A removable cylindrical layer of bonded abrasive particles, *eg* diamond, silicon carbide, fused alumina, is formed first by electrophoresis on an

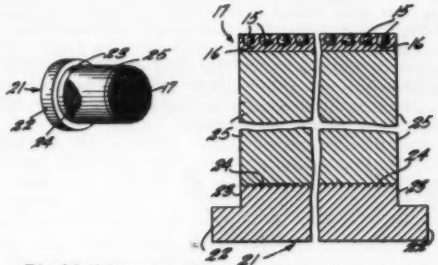

Fig 25 (left). A perspective view of the tool.
Fig 26. A sectional view. USP 2,904,418.

optically flat surface of a cylindrical body in a master mould. A holding member is then placed at a interval from the layer on the master and a molten alloy flows into the space between master and member. Finally, the master is removed and a tool obtained as shown in Fig 25 in perspective and in Fig 26 in section, with particles 15 providing an optically flat surface accurately positioned parallel to holder 21 to be inserted in a suitable chuck for precision lapping. Layer 17 may be electrolytically etched away to expose abrasive particles 15. (9 claims, 7 illustr). Ref cited: 8 USP; see also USP 2,858,256 (electrophoretic deposition); 2,848,391 (removable layer).

J *Nv Qc.545/Pe Qc.545*

Swiss P 340,117 **D. W. Daniel, National Broach & Machine Co**

(Apr 30, 1956—conv date, USA)

Method of making a tool for finishing gear wheels. Procédé de fabrication d'un outil pour le finissage de roues dentées

The tool is intended particularly for finishing (helicoidal, hypoid) bevel gear wheels with teeth modified by removal of material near the tips and the roots of the teeth. Usually the tool is a pinion for finishing a wheel and a wheel for finishing a pinion. A plastic replica is formed, *eg* of the wheel, and another replica of the pinion is made from a hard elastic plastic material in which abrasive particles are embedded. These replicas are rotated in mesh with each other to remove material by the action of the abrasive. Then a mould is made from the plastic replica and in this mould a tool is formed with teeth which, at least in parts, have abrasive particles in their surface. The tool may have a metal core. As plastic material for the tool, an epoxide resin reinforced by glass or asbestos fibres has given excellent results, with silicon carbide particles as the abrasive. (9 claims, 1 illustr).

J *Ad Chm Pe.193.545*

REQUESTS FROM AMERICA

American readers who wish to order a photostat or reprint of an article abstracted in Industrial Diamond Abstracts are advised to apply directly to the appropriate ournal if this is an American publication.

DAS 1,060,587 **G. J. Goepfert, W. A. Spilsbury, Carborundum Co**
(Aug 4, 1951—conv date, USA)

Grinding body and method for its manufacture. Schleifkoerper und Verfahren zu seiner Herstellung

Shellac bonded grinding wheels have been hot pressed for many years. As this method is comparatively expensive, experiments have been made to find shellac mixtures suitable for the cheaper cold pressing method. Hitherto such experiments have been unsuccessful. It has now been found that a bond comprising a reaction product of powdered shellac mixed with melamine, and if desired a heat resistant synthetic resin and/or an oil, makes it possible to use the cold pressing method if a suitable solvent and wetting agent is present in the mixture, *eg* tetrahydrofurfuryl alcohol to which linseed oil may be added. (5 claims).

J *Pe Urb:Qc.545*

POWDER METALLURGY

New achievements of powder metallurgy

Z. Ministr. *Strojirenstvi* 1959 Vol 9 (7) pp 525-527 (July); *Battelle Tech Rev—Abstr* 1959 Vol 8 (11) p 661a (Nov) (Original in Czech)

Recent results which were achieved in manufacturing steel parts impregnated with copper. New methods of improving the strength properties of parts made of steel powder by adding phosphorus and manganese.

D *Vwlb.132*

Clear as glass, hard as metal. Klar wie Glas, hart wie Metall

Anon. *Glas-Email-Keramo Techn* 1960 Vol 11 (2) p 53 (Feb) (In German)

In the US, a new ceramic material, chemically related to the ruby and the sapphire and possessing the properties of transparency, great hardness, and resistance to heat, has been produced by compressing aluminium-oxide at room temperature, then subjecting it to a high temperature.

K *Pd:Bl.1312*

Powder metallurgy: I, Trial production of metallic bonded grinding wheels

E. Hayashi, S. Demachi. *Nagoya Kogyo Gijutsu Shikensho Kokoku* 1952 Vol 1 (3) pp 11-15; *Ceram Abstr* 1960 Vol 43 (2) p 27 (Feb)

Metallic bonded abrasive wheels were produced by the hot-press and cold-press methods; the latter method was found to be difficult. A comparison of the test wheels with vitrified bonded wheels showed greater abrasion of the test wheels (0.008 mm abrasion per 0.01 mm of grinding). A smoother surface was obtained with the test wheels, however, and less localized heating was observed.

D *Qf:Pe Urc:Qc*

Recent trends in engineering: high-temperature ceramic

Anon. *Times Rev Ind* 1960 p 24 (Feb)

An account of silicon nitride, based on a report of work done at the Admiralty Material Laboratory, which appeared in a recent issue of the National Research Development Council's bulletin.

See *Industr Diam Abstr* 1960 Vol 17 p A52 (Feb).

1 illustr. *D* *Bl Vbb.131*

Development of a synthetic mica ceramic suitable for use at 750° C

P. S. Hessinger, T. W. Weber. *Bull Amer ceram Soc* 1960 Vol 39 (1) pp 10-12 (Jan)

A new process is described in which synthetic mica is precipitated during firing as the primary crystalline phase in a lead glass binder resulting in a ceramoplastic of unusual properties. The material can be machined by ordinary shop tools using techniques analogous to standard glass bonded mica fabrication. This factor plus low dielectric loss, and a thermal coefficient of expansion matching stainless steel has resulted in successful preparation of sealed terminals and headers, fired-on printed circuits and other special electronic insulation components. 5 illustr, 1 table.

X *Bcbz Ceq/Bcbz Ueb*

Alloy produced by powder metallurgy

Johnson, Matthey & Co Ltd, 73-83 Hatton Garden, EC 1. *Sheet Metal Ind* 1960 Vol 37 (393) p 82 (Jan)

A material composed of tungsten, nickel, and copper and made by a powder metallurgy technique is being produced commercially. It is said to have a uniform structure, high strength, and great density. As the material is suitable for all conventional machining and grinding processes it can be used for components where high mass, high strength, and small volume are important.

D *Qf:Cz Sbd*

Lead zirconate piezoelectric ceramics

A. E. Crawford. *Brit Commun & Electron* 1959 Vol 6 (7) pp 516-519; *Instrum Abstr* 1959 Vol 14 (8) p 278 (Aug)

D *Blz Ueb*

Suggestion concerning the substitution of sintered metallic components for steel parts. Vorschlag zur Verwendung metallischer Sinterteile an Stelle der visherigen Stahlteile

M. Thanscheidt. *Feingeraetetechnik* 1960 Vol 9 (2) pp 83-85 (In German)

8 illustr. *K* *Az Bf Cql* Az Bfd*

MISCELLANEOUS

Jewellers' handbook. Handbuch fuer Jeweliere

K. Schupp. *Gold u Silber* 1960 Vol 13 (2) p 32 (Feb) (In German)

Book, Ernst Kessler, Idar-Oberstein. 1954. Price DM 10.--.

This is a work written from practical experience for practical jewellers. The book is divided into three main sections and is in a alphabetical order for easy reference. There is a name index in foreign languages. It is of special interest to dealers.

[Not in library of Industrial Diamond Information Bureau].

K *Tg.52*

Contribution to the scientific study of machine tool productivity. Contribution à l'étude scientifique de la productivité des machines-outils

R. Grandadam. *Machine-Outil Franç* 1960 Vol 25 (152) pp 67, 69, 71, 73, 75 (Mar) (In French)

The first of this series defines the problems to be solved and the objects which are to be attained. The writer emphasizes the need for a method of calculation and examines the factors to be considered. (To be cont).

K *Pr.1346.21*

Corporation members of the American Ceramic Society
Anon. *Bull Amer ceram Soc* 1960 Vol 39 (1) pp 33-48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68 (Jan)
D *Bl.243.342*

The influence of machine maintenance on economy in the engineering industry. Einfluss der Maschinen-Instandhaltung auf die Wirtschaftlichkeit der Fertigung
W. Ulbricht, A. Bronner. *Werkstattstechnik* 1960 Vol 50 (1) pp 1-7 (Jan) (In German)
14 illustr. *K* *Vwk.25:Pr.138*

The story of diamonds and archaeology
Anon. *Diamond News* 1960 Vol 23 (4) pp 19-20 (Jan)
D *F.28*

Old Kimberley 're-discovered' [:] diamond buyers of other days recalled
C. B. Harris. *Diamond News* 1960 Vol 23 (4) pp 22-23 (Jan)
1 illustr. *D* *F.251.3612:.28*

Rotation differentials on workpieces between different points. Rundlaufdifferenzen an Werkstuecken zwischen verschiedenen Spitzen
F. Krueger. *Werkstattstechnik* 1960 Vol 50 (2) pp 82-83 (Feb) (In German)
K *Chcc*

Production engineering development in Britain
D. F. Galloway. *Industr Anzeig* 1960 Vol 82 (15-16) pp 222-225 (Feb 23) (In English, abstr in German and French)
9 illustr. *K* *Vwkc.132.321*

The Czech machine tool industry. L'industria cecoslovacca delle macchine utensili
Anon. *Macchine* 1960 Vol 15 (1) pp 33-40 (Jan) (In Italian)
22 illustr. *M* *Pr.25.326*

Spark hardening of metals
N. C. Welsh. *J Inst Metals* 1959 Vol 88 (3) pp 103-111 (Nov); *BNF Bull* 1960 Vol 40 (368) p 109 (Mar)
M *Bf Ckz*

An attempt to establish a machinability index based on the cutting power involved. Versuch der Aufstellung einer Bearbeitbarkeitskennziffer auf Grund der Schnittkraft
I. Bendixen. *Werkst u Betr* 1960 Vol 93 (3) pp 141-146 (Mar) (In German)
10 illustr, 14 ref, 3 tables.
K *Unp.21*

Carbide tools in American industry. Gli utensili al carburo nell' industria americana
Anon. *Macchine* 1960 Vol 15 (1) pp 69, 71 (Jan) (In Italian)
2 ref. *M* *Pdc.25.342*

East German machine tools at Leipzig. Ostdeutsche Werkzeugmaschinen in Leipzig
K. Glaeser, B. Hoppe. *Maschinenwelt u Elektrotechnik* 1960 Vol 15 (2) pp 46-48 (Feb) (In German)
1 illustr. *K* *Pr.27.322*

American Machinist 1960 production preview
Anon. *Amer Mach* 1960 Vol 104 (2) pp 131-161 (Feb)
Short descriptions of various manufacturers' recent models are listed alphabetically under such general headings as turning, drilling, grinding, lapping and honing, electrical and ultrasonic machining. Reference is made to reviews in 1959 numbers of *American Machinist*. *D* *Pr.25.342*

Check on machining imperfections. Contrôles des imperfections d'usinage
Anon. *Eurotec* 1960 (5) p 6 (Feb) (In French, abstrs in English, German & Italian)
Electronic control device for mass-production machining. The machine stops automatically in case of tool breakage. 1 illustr. *K* *Pr Wpz*

The calculation of boring times by means of the card-indices of the Bureau des Temps Elementaires. Le calcul des temps de perçage par les fichiers B.T.E.
Anon. *Machine-Outil Franç* 1960 Vol 25 (151) pp 133, 135, 139, 141, 143, 145 (Feb) (In French)
14 illustr. (To be cont).
K *Cfd.1456*

Lubrication by solids
J. Gaensheimer. Paper to Seminar on Friction, Lubrication and Wear, Lucerne, Switzerland. 1959 (Sep 18), 8 pp
Includes sections on graphite and molybdenum disulphide. 19 illustr, 24 ref, 1 table.
D *Bz Qr*

The material Alundum, mentioned in an abstract entitled 'Vitrified grinding wheels fired at low temperatures' on page A24 of the January issue of *Industrial Diamond Abstracts*, is a registered trade mark of Norton Abrasive Company.

IDR REPRINT SERVICE

The following Reprints are now available from Industrial Diamond Information Bureau, 2 Charterhouse Street, London EC 1, at a charge of 1s each, post free:
C 98—The resistance of diamond to abrasion, by E. M. Wilks and J. Wilks (*Phil Mag* 1959).
I 252—A new method of determining the average shape of diamond and other particles, by J. F. H. Custers and F. A. Raal; A counting device for diamonds, by F. A. Raal, (*IDR* 1959).
I 253—Factors affecting the efficiency of resinoid-bonded diamond wheels, by R. G. Weavind (*IDR* 1959).

PUBLICATIONS RECEIVED

BOOK REVIEWS

Glass and the diamond. Glas und Diamant

H. Gause. Urania Verlag, Leipzig, Jena. 1958, 178 pp, illustr. Price DM 3.40. (In German)

The book deals with the properties and applications of glass and diamonds with special reference to the precision optical industry. Although diamond is seldom used in optical appliances, it is of great importance as a means of machining and finishing glass. Its properties, production, and applications in this industry are the object of careful study. The book is intended for those with little specialized knowledge as well as for the expert, and there is a glossary of technical terms.

K *Bm Ceq N.52*

Measurement and machine control by means of gratings

National Physical Laboratory. 1960, 2nd ed, 11 pp (Jan)

Moiré fringes are formed by the interaction of two gratings. The movement of these fringes, which can be conveniently measured by counting techniques, represents a highly amplified and accurate indication of relative movement between the gratings. The availability of these gratings has led to a variety of applications, among them the measurement of errors of machine tools and the correction of these errors by a feedback system. This booklet explains the formation of fringes and gives details of the variety of applications of moiré fringe techniques. It is concluded that, considered as a measuring tool, the technique has many advantages, but its eventual effect on science and industry will depend largely on the efforts of data processing experts and automation engineers.

See BP 817,051, abstr *Industr Diamond Abstr* 1960 Vol 17 p A22 (Jan). 18 ref.

D *Pr V W:Tfd.52|Pr Wp:Tfd.52*

Precision boring and the precision machining of bore-holes. Feinbohren und Feinbearbeitung von Bohrrungen

A. Gerson. DEVA-Fachverlag in der Deutschen Verlags-Anstalt GmbH, Stuttgart. 1958, 65 pp, illustr. Price DM 4.80. (In German)

This book, which is part of the series 'Precision Machining' under the general editorship of H. Finkelnburg, sets out to give a clear and wide-ranging survey of precision boring and the precision machining of bore-holes. The author does not limit himself to the particular process of precision boring as defined, but describes the various processes which can be used in this field, so that the reader may choose for himself the one most suited to his needs. In order to make the book as comprehensive as possible, a section on the precision turning of bore-holes is also included.

K *Az Ceqhb|.52|Cfdb.52*

Yearbook of surface technique, 1960. Jahrbuch der Oberflaechentechnik, 1960

Ed: W. Wiederholt, Metall-Verlag GmbH, Berlin. 1960, 16th ed, 1076 pp, illustr, tables. Price DM 22.50. (In German)

As in previous years, the book contains a wide range of original articles. One on the applications of abrasive pastes in the precision machining of metals gives special attention to diamond pastes. There are also comprehensive surveys of technical literature, patents and standards.

K *Az Chc Kmg.515*

Yearbook of grinding, polishing and surface machining, 1960. Jahrbuch der Schleif- und Poliertechnik und der Oberflaechenbehandlung 1960

B. Kleinschmidt. Vulkan-Verlag Dr W. Classen, Essen. 1960, 402 pp, illustr, tables. (In German)

As previously, the yearbook is intended to be a practical guide, giving information on all aspects of grinding, polishing and machining. This year, special emphasis is laid on new developments in the machining of sintered metals as a result of the introduction of synthetic diamonds.

As usual the book is divided into 4 sections: (i) grinding materials; (ii) methods and applications; (iii) machines and tools; and (iv) general information. In the first section there is an article entitled, 'What the user of the grinding wheel, the most important grinding tool, should know', which discusses briefly the various kinds of truing tools. Section (*ii*) has an article on the importance of synthetic diamonds, in which the relative merits of natural and synthetic stones are discussed, while section (*iii*) contains an interesting article on the properties and applications of diamond tools. The book is abundantly illustrated.

K *Az Ceqm.52|Az Chc.52|Az Chm.52*

TRADE LITERATURE

Trowe industrial diamonds; Diamond tools. Trowe Industrie-Diamanten, Diamant-Werkzeuge

Trowe Industrie-Diamanten KG, Duesseldorf, Rosstr 112, Germany. 4 pp, 8¼ × 11¾ in. illustr. (In German)

This is an illustrated list designed to give some idea of the range of diamond products produced by the firm. It covers both mounted and unmounted uncut diamonds of various applications, including truing, profiling and hardness testing. Diamond grinding wheels of various kinds, and diamond tools, including multiple diamond truing tools and drill crowns, are also listed.

K *N.57*

Catalogue No 160

Paul L. Kuzmick Co, 271-279 Grove Ave, Verona, NJ. 29 pp, 8½ × 11 in., illustr

The new identification code for diamond wheel shapes, designated by the American Standards Association, is included in this catalogue of diamond wheels and hones with resinoid, metal and vitrified bonds. Full specifications and prices are given.

D *Nv.57*

Sanford surface grinders

Sanford Manufacturing Corp, 1020 Commerce Ave, Union, NJ. 8 pp, 8½ × 11 in., illustr

A leaflet on the Sandford bench surface grinder Model SG and micro grinder Model MG. Model SG was developed to fill the need for a precision surface grinder adapted exclusively for small parts and is claimed to be unrivalled for this application. Capacity is 4 in. × 8 in. × 6 inch. Dry surface grinding of dies, gauges, instrument parts, *etc*, may be done, and the SG can be adapted to wet grinding. Specifications are given. Optional equipment includes diamond wheel dresser and holder, cutter grinding attachment, and portable mounting table.

The MG micro grinder for dry or wet grinding is a larger, heavier duty surface grinder than Model SG, having a capacity of 8 in. × 12 in. × 12 inch. Qualities claimed are high precision, large capacity and low cost. Diamond wheel dresser and holder are optional.

D *Chcm Pr.57|Nj Psfz*

Acro-Test diamond hardness testers

Rel-Tok Diamond Tool Co, 10 Franklin St, Allston 34, Boston, Mass. 5 pp, 8½ × 11 in., illustr

A leaflet describes the uses and advantages of Acro-Test diamond hardness tools, illustrates special designs, and gives advice on the care of diamonds for hardness testing. Advantages of the 'C' scale Rel-Tok diamond tool are said to include maintenance of sine-bar accuracy on the conical accuracy of the diamond through the use of specially designed fixtures; ball tip of the diamond is perfect under 200 magnification and higher polish on the diamond ball and angle resists wear and produces consistent hardness readings; and the diamond matrix is a sintered metal which will not compact under pressure. Tools of special design allow testing in the flutes of taps, reamers and twist drills, and in areas where standard shape Rockwell diamond holders cannot reach. Faceted diamond testers, Vickers, Firth, *etc*, are also covered.

D *Nd Wgh.57*

Famo tungsten carbide chip breaker grinding machine. Famo Hartmetall-Spanbrechernuten-Schleifmaschine zum Vertikalschleifen

Fr Aug Muenzenmaier Maschinenfabrik, Ober-Esslingen, Neckar, Germany. 4 pp, 8½ × 11⅔ in., illustr. (In German)

The machine has a vertical grinding spindle and automatic setting of a diamond wheel for both wet and dry grinding. Chipbreaker grooves for either broken or curled swarf can be ground. The spindle speed is 4,600 rev/min, 92 ft/sec, and the wheel size is 5 in. diameter and 20 mm bore. The universal table has a special clamping device, allowing three totally independent angular settings for tools of different shapes. The grinding wheel is oscillated by hand on a 6 in. stroke, and it is of a new type which remains constant in profile until completely used.

A *Chc Pr Psq.57*

Titanium machining techniques—Titanium Engineering Bulletin No 7

Titanium Metals Corp of America, 233 Broadway, New York 7. 32 pp, 8½ × 11 in., illustr

A booklet gives the general characteristics of titanium which influence its machinability, and lists commercially available unalloyed and alloyed titanium grades. It describes the best methods of turning, milling, drilling, tapping, reaming, broaching, routing, precision grinding, abrasive cutting and sawing. Details of tools and machines with recommended tool geometry and machine settings are also given.

D *Bfn Ceq.57*

CG2/CB & CG3/CB 'Concentre' carbide tool grinding and lapping machines

Abwood Machine Tools Ltd, Princess Rd, Dartford, Kent. 8 pp, 8½ × 10¼ in., illustr

A pamphlet describing Abwood precision machines for the grinding and lapping of carbide tipped tools. Model CG2/CB using 8 in. diameter vitrified and/or diamond wheels is particularly suitable for tools up to 2 in. in depth of section. The motorized chipbreaker unit can be added to enable this machine to grind the working faces as well as all types of chipbreaker grooves of every high speed and carbide tool. Model CG2/CB uses 12 in. diameter vitrified and/or diamond wheels, has a double Vee belt drive to the spindle and two HP main drive motor. In other respects it is similar to the first model, but has special flanges incorporating a wheel balancing device. Both models have diamond wheel truing devices. The universal motorized chipbreaker groove grinding unit, an optical extra, is described in detail and specifications given.

D *Ab Cg Nj Psf/Al Chc Nv Pr.57*

Diamonds in the service of industry

L. M. Van Moppes & Sons Ltd, Basingstoke, Hants. 34 pp, 8 × 10½ in., illustr

This publication shows how the L. M. Van Moppes organization distributes industrial diamonds throughout the world. After outlining the industrial uses of diamond, with particular reference to Van Moppes products, the various stages in diamond tool manufacture are briefly reviewed: diamond sorting and shaping departments, the single-stone and multi-stone tool setting departments, the toolroom and machine shop, inspection and production control, the Diadust section, and research and experimental work are described. Numerous photographs illustrate the text.

D *Fs.1451.57*

Intalometer No 531—universal internal micrometer. Universal-Innenmikrometer Intalometer Nr 531

Fabrik fuer Praezisions-Messinstrumente Pierre Roch GmbH, Rolle, Switzerland. 8 pp, 8 × 11½ in., illustr. (In German)

The instrument is made in three different sizes: 5 to 10 mm, 10 to 30 mm, and 40 to 100 mm, the first two having an accuracy of 0.002 mm, and the third of 0.003 mm. Measurements can be made at any point in a drilled hole, including the base of the hole since the testing point protrudes beyond the end of the instrument. As the testing points are fixed in a diagonal position between forces which counteract each other, the measuring process cannot affect its accuracy and there is virtually no friction, it is claimed.

A *Wbd.57*

IDR REPRINT SERVICE

The following Reprints are now available from Industrial Diamond Information Bureau, 2 Charterhouse Street, London EC 1, at a charge of 1s each, post free:

C 98—The resistance of diamond to abrasion, by E. M. Wilks and J. Wilks (*Phil Mag* 1959).

I 252—A new method of determining the average shape of diamond and other particles, by J. F. H. Custers and F. A. Raal; A counting device for diamonds, by F. A. Raal, (*IDR* 1959).

I 253—Factors affecting the efficiency of resinoid-bonded diamond wheels, by R. G. Weavind (*IDR* 1959).

PATENT LISTS

BRITISH

The Official Journal (Patents) 1960 (3704) (Feb 10)

832,112 ANDERSON-GRICE CO LTD. Saws for stones or like hard material.

831,927 CINCINNATI MILLING MACHINE CO. Grinding machine having an incremental feed mechanism.

932,146 SVENSKA KULLAGERFABRIKEN AB. Methods of and machines for automatic grinding.

932,170 ATELIERS HEUZE MALEVEZ ET SIMON REUNIS SA. Grinding and polishing apparatus.

The Official Journal (Patents) 1960 (3705) (Feb 17)

832,794 SANDVIKENS JERNVERKS AB. Rock drill cutting insert of sintered hard metal.

832,533 RUDKIN & RIPLEY LTD, and TARRY, F. H. Grinding and like machines.

832,481 BISTERFELD, E. (trading as BISTERFELD & STOLTING). Tubular grinding elements.

832,482 BISTERFELD, E. (trading as BISTERFELD & STOLTING). Grinding elements.

The Official Journal (Patents) 1960 (3706) (Feb 24)

833,057 HEDLEY & CO LTD, T. Alumina abrasive materials.

833,379 RED DEVIL TOOLS. Abrasive article.

833,309 PHILIPS ELECTRICAL INDUSTRIES LTD. Abrasive cutting disks.

832,952 SIMMONDS AEROCESSORIES LTD. Cutting or abrading tools.

833,316 ZAHNRADFABRIK FRIEDRICHSHAFEN AG. Arrangement for truing profiled grinding wheels for grinding helically toothed involute spur gears.

UNITED STATES

Official Gazette 1960 Vol 750 (1-4) (Jan)

2,919,521 T. M. DURNEY. Internal grinder quill.

2,919,522 P. J. ROBISCHUNG, HAMMOND MACHINERY BUILDERS INC. Machine tool.

2,919,523 W. PHILLIPS, E. D. PHILLIPS, J. B. PHILLIPS, B. M. PHILLIPS, E. H. PHILLIPS. Ophthalmic lenses and process and apparatus for producing the same.

2,919,689 E. J. BURKHART. Radius dresser.

2,919,961 R. MATTHEY, ISICO SA. Shocks cushioning bearings for measuring instruments.

2,920,026 S. S. KISTLER, NORTON CO. Grinding machine.

2,920,180 W. ULLMANN, W. EHRLICH, AGIE AG FUER INDUSTRIELLE ELEKTRONIK. Electroerosive grinding method and device for its performance.

2,920,426 W. L. WILLIAMS. Sharpener for hypodermic needles.

2,920,441 R. A. FIECHTER, A. V. TORNEK. Lubricated jeweled bearing for watch movements and other precision instruments.

2,920,947 R. E. BURK, E. H. KELLER, D. J. O'FLYNN, E. I. DUPONT DE NEMOURS & CO. Bristles for abrading surfaces.

2,921,414 W. L. GARBERDING. Means for infeeding a centerless grinder.

2,921,419 R. TOUVAY, SA DES MANUFACTURES DES GLACES ET PRODUITS CHIMIQUES DE ST-GOBAIN, CHAUNY ET CIREY. Grinding and polishing of glass sheets.

2,921,485 S. SMALL, SERVICE DIAMOND TOOL. Method of forming a diamond tool.

2,921,505 N. HOGLUND. Apparatus for forming contours on cylindrical surfaces.

2,922,021 M. H. MORRIS, SPERRY-SUN WELL SURVEYING CO. Machining method and apparatus.

2,922,022 N. MIRONOFF, ATELIERS DES CHARMILLES SA. Devices for adjusting the position of an electrode of a machine for machining by electro-erosion.

2,922,258 M. M. BASS, R. M. BELL, L. C. HAMMOND, P. J. ROBISCHUNG, HAMMOND MACHINERY BUILDERS INC. Grinder with oscillating head.

2,922,263 C. J. BOGERT sen. Convex form tool grinding and cam generator and method.

2,922,264 W. G. MUSHRUSH, SYNTRON CO. Method of lapping.

2,922,413 K. H. SCHULTZE, HERBERT LINDNER GmbH. Truing device for profile grinding wheels.

2,922,627 A. W. HAMMERER, ROTARY OIL TOOL CO. Rotary drill bits and cutters.

SWISS

Patentliste 1959 (23) (Dec)

343,134 H. HEDIGER. Apparatus for measuring surface roughness.

343,254 W. BANGERTER. Method and device for grinding industrial jewels, in particular watch jewels.

343,315 F. MISEREZ, ETS. FRANCOIS MISEREZ SA. Method of manufacturing plates and bridges for horological mechanisms.

FRENCH

Bulletin Officiel 1959 Vol 76 (3942) (Nov)

72,179/ 1,165,934 H. M. LEFEVRE. Method of fixing rings or collars on endless cables for sawing materials such as stones.

Bulletin Officiel 1959 Vol 76 (3948) (Dec); 1960 Vol 1 (1-4) (Jan)

1,216,870 SKANDINAVISKA GRANIT AB. Sawing blade for machines for cutting stone having cutting edges of hard metal.

1,216,919 C. W. ANDERSON, CIE DES MEULES NORTON. Diamond cut-off wheel.

1,217,521 NV PHILIPS' GLOEILAMPENFABRIEKEN. Device for working metal.

1,217,763 SA DES ENGRENAGES ET MACHINES MAAG. Machine for grinding gears.

1,217,893 J. JARDIN, S. A. CRAELINS. Manufacture of drilling tools.

1,218,010 R. J. BONDLEY, CIE FRANCAISE THOMSON-HOUSTON. Manufacture of styli, in particular for phonograph pick-up.

1,218,669 D. J. GRADY, HYCALOG INC. Core drill.

1,218,945 M. HUMENIK jun, D. MOSKOWITZ, FORD (FRANCE) SA. Metal agglomerate for cutting tools.

1,219,463 ATELIERS DES CHARMILLES SA. Tool for electrolytic machining and method of manufacturing this tool.

1,219,604 UDDEHOLMS AB. Percussion drilling crown.

GERMAN

Patentblatt 1960 Vol 80 (3-7) (Jan-Feb)

Applications Open to Public Inspection

1,073,418 W. TIRAPOLSKY, R. F. ROUVIERE. Turbine core drill for deep bore holes.

1,073,654 K. H. STEIGERWALD, FA CARL ZEISS. Devices for apparatus for working materials by means of a beam of charged particles.

1,073,762 H. MAHR, P. NIEMANN, DEUTSCHE GRAMMOPHON GmbH. Sound pick-up according to the piezo-electric principle for the simultaneous tracing of lateral and vertical sound tracks.

1,074,442 D. HOFMANN. Balancing device for rotating and wear exposed tools.

1,074,999 W. P. FLOHR jun, LANDIS TOOL CO. Clamping device for crankshafts the cranks of which are to be ground.

1,075,459 O. H. FLOH, E. RITZMANN, VEB WERKZEUG-UNION STEINBACH-HALLENBERG. Device for grinding and sharpening the points of twist drills.

1,075,463 C. R. MENTZER, W. P. FLOHR, LANDIS TOOL CO. Clamping device for workpieces to be machined *eg* to be ground between two shoulders.

1,075,465 B. SCHWIER, H. A. WALDRICH GmbH. A spindle on double bearings which can be driven from both sides for machine tools *eg* grinding machines.

1,075,489 K. M. TAYLOR, CARBORUNDUM CO. Method of producing dense silicon carbide bodies.

1,075,806 T. A. INSOLIO, AMERICAN WINDOW GLASS CO. Glass-cutting device.

1,075,839 K. M. TAYLOR, CARBORUNDUM CO. Sintered refractory hard metal alloy.

1,075,868 H. SCHNADT, ALFRED J. AMSLER & CO. Pendulum impact device.

1,075,972 C. W. GEHRING. Device and method for fine machining workpieces with interrupted cylindrical exterior faces.

1,076,016 K. M. TAYLOR, CARBORUNDUM CO. Method for making boron nitride bodies.

ABSTRACT NOTIONS

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LIST OF PUBLICATIONS, APRIL, 1960

***INDUSTRIAL DIAMOND ABSTRACTS:** issued monthly, from 1944 onwards, about 20 pp, 7⅞ x 9¾ in. Surveys technical, scientific, and patent literature.

***LIST OF PERIODICALS—BIBLIOGRAPHY OF INDUSTRIAL DIAMOND APPLICATIONS:** Alphabetical, 8 pp, 7⅞ x 9¾ in., Sep 1955.

***LIST OF PERIODICALS IN THE INDUSTRIAL DIAMOND INFORMATION BUREAU LIBRARY AT MAY 31, 1958:** Alphabetical, 8 pp, 7⅞ x 9¾ in. A list of periodicals available for loan from the Industrial Diamond Information Bureau Library. This does not replace *List of Periodicals* (above), which is a list of periodicals abstracted in *Industrial Diamond Abstracts*, many of which are not held by the Library.

***IDR REPRINT SERVICE :** Classified, authors' index, subject index of groups, 12 pp, 7⅞ x 9¾ in., Sep 1958. (Reprints 1s each, post free).

***THE DIAMOND RESEARCH LABORATORY:** 16 pp, illustr, 11 x 9 in. Rev ed, 1956.

SELECTED BIBLIOGRAPHIES:

* **Truing of grinding wheels** (from 1910 to 1951). 39 pp, 7⅞ x 9¾ in. 3rd rev ed, Feb 1952.

* **Diamond as cutting tool for metals and non-metallic materials.** 24 pp, 7⅞ x 9¾ in. 2nd rev ed, Nov 1950. Name index, 1951.

Hardness and hardness testing (from 1937 to 1955). 118 pp, name index, subject index, 7⅞ x 9¾ in. 1955-56. Price 5s 6d.

DIAMOND TOOL PATENTS (Patent Monographs)

IA: Machining metals and non-metallic substances, by P. Grodzinski, W. Jacobsohn. 2nd rev ed, 55 pp, 7⅞ x 9¾ in. Apr 1949. Price 10s.

II, IIs: Diamond abrasive wheels, by P. Grodzinski. 74 pp, 4 tables, name index, 7⅞ x 9¾ in. Aug 1948/49. Price 13s 6d.

III, IIIs: Truing of grinding wheels, by W. Jacobsohn. 133 pp, 82 illustr, name index, 7⅞ x 9¾ in. Dec 1948/49. Price £1.

IV: Polishing of gem diamonds, by W. Jacobsohn. 40 pp, 83 illustr, 1 table, name index, 7⅞ x 9¾ in. December, 1950. Price 12s 6d.

IA to IIIs available as compilation in Spirollo binding, price £2 9s.

THE PRINCIPLES AND DESIGN OF A NUCLEAR RADIATION COUNTER WHICH USES A DIAMOND AS ITS DETECTOR, by W. F. Cotty. 18 pp, illustr, 7⅞ x 9¾ in. Oct 1956. Price 2s 6d.

DATA SHEETS FOR THE DIAMOND TOOL DESIGNER AND MAKER—Definition and designation of angles: Comparison of names for tool angles: Plane of chip flow: Clearance and rake angles: Minimum clearance for diamond boring tools: Economic layout of tool tips: Height position of turning tools: Accepted standards. 1945, reprinted Oct 1956. Price 5s

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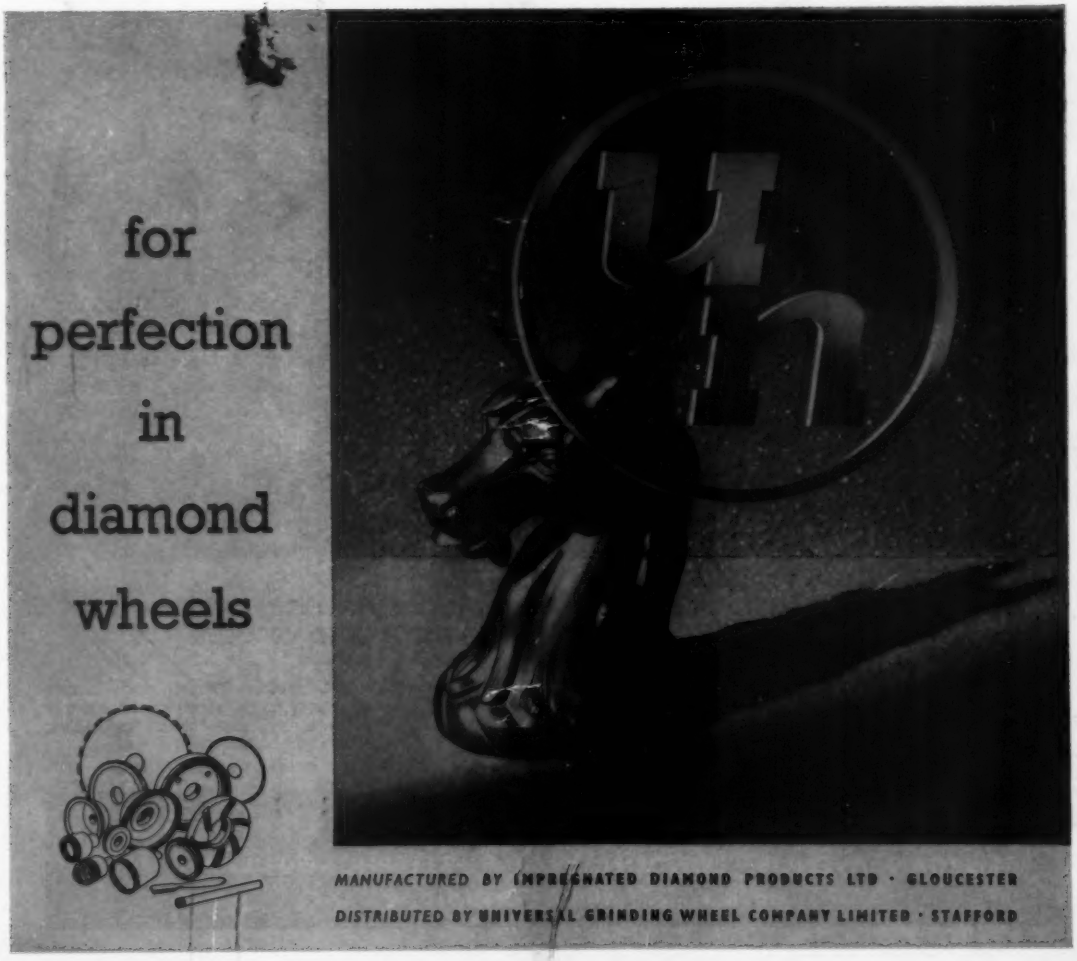
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